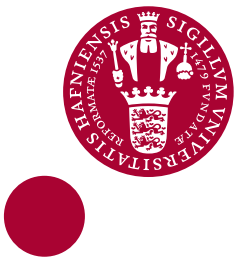

Nuclear-proof Communications?

The Cold War and the Governance of Telecommunications Security in NATO and Denmark

Jensen, Sanne Aagaard

Publication date:
2019

Document version
Publisher's PDF, also known as Version of record

UNIVERSITY OF COPENHAGEN
FACULTY OF HUMANITIES

PhD Thesis

Sanne Aagaard Jensen

Nuclear-proof communications?

The Cold War and the governance of telecommunications security in NATO and Denmark

ENIGMA
MUSEUM OF
COMMUNICATION

This PhD thesis is the product of an industrial PhD grant provided by the Innovation Fund Denmark and hosted by ENIGMA – Museum of Communication and the Saxo Institute, University of Copenhagen.

Submitted: November 30, 2018.

Supervisors:
Dr.phil. Regin Schmidt,
Associate Professor, The Saxo Institute, University of Copenhagen

Dr. Andreas Marklund,
Head of Research, ENIGMA – Museum of Communication

Front cover:
Edited illustration from 'Hvis krigen kommer', a leaflet distributed to all Danish households in January 1962 by the Prime Minister's Office. Enigma Archives.

Contents

Acknowledgements

It all began at a Christmas party.
The idea behind this project first took form back in December 2012 at the Post and Tele Museum in Købmagergade. I worked at the museum as a student and had a talk with the director, Birgitte Wistoft, about the master's thesis in history that I was about to embark on. Birgitte suggested that if I wanted to make an original research contribution, I should look towards the area of telecommunications in the Cold War era. When turning up at her office Monday morning, Birgitte had already dug out source material that I could begin exploring. Since that day, the topic of telecommunications and Cold War security has somehow been part of my life. Thank you Birgitte for arousing my interest in this topic (to be sure, I would never have come across this myself) and for believing in my abilities to pursue a research career.

This project would never have been realised without the generous support from the Post and Tele Museum – now transformed into ENIGMA – and the scholarship awarded by the Innovation Fund Denmark. Moreover, the project would never have landed where it did without two important persons. My two supervisors, Andreas Marklund and Regin Schmidt, have both separately and together been a great support. Your comments to my many drafts and to the overall project have been invaluable, and with your quite different approaches, both of you have shaped me as a researcher. I have been more fortunate than most PhD students, since I have not only been supervised by you, but also, in two different ways, been colleagues with you. I have learned a lot from working with both of you – thank you for that.

While carrying out this research project, a new star was born: Enigma, the museum of communication in Copenhagen, into which the former Post and Tele Museum was transformed in 2016. Jane Sandberg adopted my project when taking over as director, and I am grateful that Jane saw its potential right from the outset. The process of developing the new museum with the enigmatic team has not only been interesting, fascinating, and fun – it has also added many new perspectives to my research. Thanks to all of my colleagues at Enigma for being a great support and a wonderful and cheerful company along the way, not least in the very final – and, as it turned out, also very long – phase when I was waiting for the security approval.

I sincerely want to thank a number of people who have helped me out in different ways, for instance with finding archive material or by sharing their knowledge about the topic: Eva Wistoft Andersen, Palle Juliussen, Poul Holt Pedersen, personnel at the Center for Cyber Security, archivists at the Danish National Archives and the NATO Archives, and the five informants that I

interviewed back in 2013: Arne Colding, Bent Højer, Jan Jensen, Hemming Raun, and Gunner Frank. Along the way, different colleagues have provided useful comments on papers that I have presented in different contexts, including Léonard Laborie, Linda Risso, Karen Gram-Skjoldager, Daniel Headrick, Karen Vallgårda, Niklas Olsen, and Jes Fabricius Møller. I owe a very special thanks to Mogens Rüdiger for thorough and encouraging comments at my pre-defence in June 2018.

I have enjoyed being part of the academic life at the Saxo Institute at the University of Copenhagen. In particular, the contemporary history group and the PhD group have been rewarding fora for me and given valuable comments on my work. Sniff Andersen Nexø has been a great help regarding the administrative side of the life as a PhD student. Moreover, I owe a debt of gratitude to Rasmus Mariager, who taught me a lot when supervising my master's thesis, assisted me in applying for funding for this PhD project, and has since then helped me find my way into academia. Besides, when taking a year's break from my PhD research in the beginning of 2017 to take part in the historical examination of Denmark's participation in military conflicts in the late 1990s and early 2000s, I was fortunate to become part of a great research team. Thank you for the company Rasmus, Anders, Regin, Mikkel, Jakob, and Clara.

I have profited a great deal from being part of international research networks. In the fall of 2015, I was a visiting PhD student at the Centre of the History of Science, Technology and Medicine (CHSTM) at the University of Manchester. My stay at CHSTM opened up my eyes to what the discipline of history of science and technology has to offer. I wish to thank Simone Turchetti for facilitating my stay at CHSTM and for giving me inspiration to my project in its early stages. Likewise, the research network Tensions of Europe has served as a stimulating and rewarding entrance for me into the world of history of technology. Furthermore, in the spring of 2018 I spent two months at the Division of History of Science, Technology and Environment at KTH Royal Institute of Technology in Stockholm. This stay was a perfect setting for an intensive writing process, and I enjoyed being part of the daily, inspiring life at the division.

Finally, I wish to thank my friends and family. I am grateful for the everlasting support of my parents and for all the help with proof-reading from Martin and Jap. Last but not least, my partner Christian has been the best travelling companion along the way that one could ask for. More than anyone else, Christian has been part of the many ups and downs that comes along with a PhD project. Thank you for being a challenging discussion partner, for offering me distraction when needed, for bearing with my absence when I have been abroad or my mental absence at home, and for your never-ending enthusiasm and support.

List of Abbreviations

including archive abbreviations

ALLA	Allied Long Lines Agency
CCPC	Civil Communications Planning Committee
CFS	Civilforsvarsstyrelsen / The Civil Defence Board (DK)
DK	Denmark
DPC	Defence Planning Committee (NATO)
EA	Enigma Archives, Copenhagen (DK)
EEC	European Economic Community
ELLA	European Long Lines Agency
EMCCC	European Military Communications Coordination Committee
ERFA	European Frequency Agency
FE	Forsvarets Efterretningstjeneste / The Defence Intelligence Services (DK)
FFSB	Forsvarets Fellessamband / The Defence Communications Agency (Norway)
FkT	Fyns kommunale Telefonselskab (DK)
FKO	Forsvarskommandoen / Defence Command Denmark
FM	Forsvarsministeriet / The Ministry of Defence (DK)
FTF	Forsvarets Telegrafforvaltning / The Defence Telegraph Administration (DK)
FTT	Folketingstidende / The Proceedings of the Folketing (DK)
ICT	Information and communication technologies
IM	Indenrigsministeriet / The Ministry of the Interior (DK)
IMSK	Den Interministerielle Signalkomité / The Inter-Ministerial Signal Committee (DK)
ITTS	IT- og Telestyrelsen / The IT and Telecom Agency (DK)
ITU	The International Telecommunication Union
ITU-H	The History of ITU Portal
JTAS	Jydsk Telefon A/S (DK)

KTAS	Kjøbenhavns Telefon A/S (DK)
MC	The Military Committee (NATO)
MOA	Ministeriet for Offentlige Arbejder / The Ministry of Public works (DK)
NA	NATO Archives (including the online collections)
NAC	The North Atlantic Council
NA-E	NATO E-Library
NALLA	National Long Lines Agency
NATO	North Atlantic Treaty Organisation
NICS	NATO Integrated Communications System
P&T	Post- og Telegrafvæsenet / The Postal and Telegraph Services (DK)
PET	Politiets Efterretningstjeneste / The Security and Intelligence Services (DK)
PDD	Public Diplomacy Division, NATO
PTT	Postal, Telegraph and Telephone Services
RA	Rigsarkivet, Copenhagen / The Danish National Archives
RDT	Rigsdagstidende / The Proceedings of the Rigsdag (DK)
RUCB	Regeringsudvalget for Civilt Beredskab / The Government Committee for Civil Emergency Planning (DK)
SACEUR	Supreme Allied Commander Europe
SCB	Sekretariatet for Civilt Beredskab /The Secretariat for Civil Emergency Planning (DK)
SCEPC	Senior Civil Emergency Planning Committee
SG	The Standing Group (NATO)
SHAPE	Supreme Headquarters Allied Powers Europe
SO	Samordningsudvalget / The Coordination Committee under the Telephone Control Board (DK)
SU	Samarbejdsudvalget / The Coordination Committee under the Telephone Control Board (DK)
TM	Trafikministeriet / The Ministry of Traffic (DK)
TTS	Telefontilsynet / The Telephone Control Board (DK)

UM	Udenrigsministeriet / The Ministry of Foreign Affairs (DK)
UN	United Nations
WUDO	Western Union Defence Organisation
ØM	Økonomiministeriet / The Ministry of Economic Affairs (DK)

[1]

Introduction

In the archives of the former Danish telephone company Jydsk Telefon A/S (JTAS), one finds a drawing illustrating the effects of a 30-kiloton atomic bomb exploding at a height of 600 metres. The drawing depicts how, within a radius of 700 meters from the attack target, complete obliteration is to be expected. Less damage is expected when moving further away from the centre: Within a radius of 1400 meters from the attack target, electronic material is expected to be completely destructed, while moderate damage on brick buildings is expected within a radius of 2900 meters.[1]

The drawing, dated January 11 1956, was sent to the telephone company from a colonel in the Danish Defence. The occasion for this rather dramatic letter was a discussion that had taken place in the autumn of 1955 regarding the automation of the public telephone exchange in the town of Slagelse on the Danish island of Zealand. Slagelse was actually located outside of JTAS' operating area, but the telephone company operating in that region, Kjøbenhavns Telefon A/S (KTAS), had reported on its plans for a new building for the exchange at a meeting with representatives from the Danish telecom sector. The colonel, who participated in the meeting as an observer, objected that in relation to similar projects in the future, the telephone companies would have to pay more attention to national security. The drawing, sent to all three Danish telephone companies and the Postal and Telegraph Services (P&T) as a follow-up on this discussion, was complemented with the message that the colonel was now ready to discuss this "most important issue" with them.[2]

While the drawing does not seem to have caused a reaction in neither JTAS nor the other addressees, it did usher in a new era. The drawing reflected a new challenge caused by the geopolitical circumstances of the Cold War: What would happen to the public telephone network in Denmark if it came to nuclear war? How could the network be protected against this threat? And who were responsible hereof?

Indeed, by 1956 the 'atomic age' had arrived, also in the area of telecommunications. In the years and decades that followed, the Danish

[1] Illustration sent from FTF, January 11 1956. JTAS, Journalsager 1896-1988, 209. RA.
[2] Minutes of SU meetings, October 27 1955 and January 26 1956. TM, TTS, Bilag til samarbejdsudvalgets møder. RA.

telephone companies and the P&T took part in a wide range of initiatives with the purpose of preparing the telecommunications infrastructure for a nuclear war. This played out within the framework of the North Atlantic Treaty Organisation (NATO) of which Denmark had been a member since its establishment in 1949.[3] As a defence alliance, NATO was worth little if its member states, commands, and agencies were not able to communicate securely and reliably with each other – on an everyday basis as well as in critical situations. As a 1971 NATO report underlined, "[w]ithout continuing reliable communications, a government could not govern, the military effort could not be sustained, and national participation in the defence effort at NATO level would be inhibited." Moreover, the report stressed that "[t]elecommunications is not a field in which, in a time of crisis, improvisation could make up deficiencies in peacetime planning and provision."[4] Accordingly, through the decades of the Cold War, a wide range of steps were taken within NATO to connect and to protect national and transnational telecommunications infrastructure.

* * *

The aim of this dissertation is to investigate how the Cold War brought about a new security framework in the area of telecommunications. I do this by studying different efforts to protect communications infrastructures in NATO and in Denmark from the late 1940s through to the years around 1990. I examine how telecommunications were governed in terms of security, and more specifically how the different efforts to provide secure telecommunications were shaped by both technological and political agendas.

Today, we label such efforts to secure communication facilities as 'critical infrastructure protection' and the protection of information and communication systems as 'cyber security'. Although both terms are products of the post-Cold War era, the perception and governance of communication infrastructures as crucial and vulnerable have a long history.[5] In fact, as the American historian of technology Daniel Headrick has called attention to, the quests for reliability and security have been important factors in the

[3] The North Atlantic Treaty was signed in Washington on April 4 1949 by the United States, Canada, the United Kingdom, France, Belgium, Luxembourg, the Netherlands, Norway, Iceland, Denmark, Portugal, and Italy. From 1950, the cooperation on the treaty was referred to as the North Atlantic Treaty Organisation (NATO).
[4] Schedule on maintenance of government, April 8 1971. Annex A to C-M(71)18. NA.
[5] For the critical infrastructure agenda of the 1990s, see van der Vleuten et al., "Europe's Critical Infrastructure and Its Vulnerabilities", p. 3; Collier and Lakoff, "The Vulnerability of Vital Systems", p. 17. For emergence of the concept of cyber security, see Hansen and Nissenbaum, "Digital Disaster, Cyber Security, and the Copenhagen School".

development of communication networks since the mid-nineteenth century, when the development of the electric telegraph marked the beginning of modern telecommunications.[6] Since then, with a view to security, governments and private operators have taken a number of measures to protect communication facilities and the information transmitted through them: Landline cables have been dug deeply into the ground; submarine cables laid along the least exposed routes; communication nodes relocated to secret out-of-the-way places; messages encrypted; and plans for maintaining communications in case of emergency prepared. Today, as the cyber threat ranks as one of the main security threats against modern, digitised societies, governments and other security actors put major efforts into safeguarding information and communication technologies.[7]

In historical research on telecommunications security and politics, communication networks have often been studied as an element of power in diplomatic relations or an instrument of state control.[8] For the Cold War period, the role of telecommunications in the geopolitical conflict has for example been explored in studies of the development of satellites as part of the superpower space race, of radio broadcasting as an arena for propaganda, or of the application of high-tech interception systems for the gathering of signal intelligence.[9] This dissertation, by contrast, suggests another lens through which to study telecommunications during the Cold War: In the atomic age, as the JTAS drawing indicates, the threat of nuclear war caused governments and actors in the telecommunication sectors to think differently about the vulnerability and 'criticality' of transnational and national communication networks. The preparations for a total war that took place in NATO and the alliance's member states illuminated the crucial role that telecommunications played for all parts of modern societies – governments, defences, businesses, and individuals in times of peace as well as war. In this light, telecommunication infrastructures emerged as a backbone of modern society.

This topic has only been touched upon very briefly in previous research. We know today that NATO invested heavily in constructing communication facilities for defence purposes in the member states and that national

---

[6] Headrick, *The Invisible Weapon*, p. 5.

[7] See for instance the latest cyber treat assessment from Denmark: CFCS, *Trusselsvurdering: Cybertruslen mod Danmark*. In response to the cyber threat, the NATO allies proclaimed cyber defence a part of the alliance's core task of collective defence in 2014 and recognised cyberspace as an operational domain in 2016. See: Nato, "NATO Cyber Defence".

[8] See for instance Headrick, *The Tools of Empire*; Headrick, *The Invisible Weapon*; Winseck and Pike, *Communication and Empire*; Hills, *The Struggle for Control of Global Communication*; Hills, *Telecommunications and Empire*.

[9] See for instance Slotten, "Satellite Communications, Globalization, and the Cold War"; Aid and Wiebes, "Introduction on The Importance of Signals Intelligence in the Cold War"; Risso, "Radio Wars".

governments and telecom authorities prepared secret and secure systems for the vital communications that needed to be prioritised in wartime. However, besides knowing that such facilities and systems existed, we still lack an understanding of the underlying visions and wider significance hereof. It is my hypothesis that the attempts to secure telecommunication systems in the Cold War were also attempts to promote specific technological and political agendas in communications. Therefore, in this dissertation I examine developments in the area of telecommunications through the lens of Cold War security politics. I do this in three different ways.

First, my examinations deal with interactions of politics and technologies. The Cold War was a state of conflict which emerged in the aftermath of the Second World War between a Western and an Eastern bloc, representing the two different political systems of capitalism and socialism.[10] In recent years, historians have explored how this political conflict also manifested in technologies – not only in the development of nuclear weapons and space technologies as part of the race between the two superpowers, the United States and the Soviet Union, but also in other technological areas.[11] Building on this, I take my point of departure in the assumption that Cold War politics – and more specifically regional alliance politics in NATO and national security politics in Denmark – translated into technological and organisational practices in the area of telecommunications.

Second, in continuation hereof, I examine what I refer to as the 'Cold War preparedness agenda'. In a Western European perspective, the Cold War years can be characterised as an 'era of preparedness', as the military build-up of Western Europe beginning in the late 1940s with the aim of deterring a Soviet attack went hand in hand with an increased awareness to civil defence and emergency planning. Moreover, since both superpowers possessed large arsenals of nuclear weapons, the Cold War conflict was in its essence defined by the threat of nuclear war. In response to the Soviet Union's test of the atomic bomb in 1949, the hydrogen bomb in 1953, and the later development of inter-continental ballistic missiles capable of reaching long-distance targets on enemy territory, preparing for war in the Western block essentially meant planning for survival in a nuclear war. Under the umbrella of a 'total defence' – in response to the prospect of a total war – all parts of the society including public authorities, private businesses, and the civilian population were somehow involved in the preparedness planning, including actors in the telecom sector.

---

[10] On the characterization of the Cold War, see Westad, *The Cold War*, p. 1f.; Lane, "Introduction: The Cold War as History", p. 1; Olesen, "Den Kolde Krigs Historie", p. 11; Immerman and Goedde, "Introduction".

[11] See for instance Hecht and Edwards, "The Technopolitics of the Cold War"; Reynolds, "Science, technology, and the Cold War".

In this way, the very notions of defence and security were broadened and the boundaries between military and civilian spheres were blurred.

Third, I explore the junction between national, international, and transnational telecommunications. Historically, communication infrastructures have primarily been a responsibility of the nation state and have been constructed and protected within the confines hereof. However, modern telecommunications – as indeed many other modern infrastructures – are transnational nearly by definition, facilitating cross-border flows of communication and information. Cooperation between nation states on telecommunication matters therefore has a long history, both on a bilateral basis and within an international framework, not least marked by the 1865 establishment of the International Telecommunication Union (ITU).[12] In the Cold War period, more international arenas for collaboration on communications between states appeared, one of them being NATO, within which the construction, interconnection, and protection of both national and transnational telecommunications infrastructures evolved to be an important task. While the responsibility for doing so remained at the member state level, national communications were taken into a new international context, since the commitment of the North Atlantic Treaty that each member state should "maintain and develop [its] individual and collective capacity to resist armed attack" could also be regarded as applying to national communications.[13]

Thus, by examining how the Cold War preparedness agenda became a motive force for technological and organisational developments in the area of telecommunications and how this manifested in technopolitical practices shaped in a national, transnational, and international setting, this dissertation offers new perspectives to both the history of telecommunications and Cold War history. This introductory chapter provides a framework for my analysis. In what follows, I will first elaborate on my research question and situate my work in the existing historiography related to these issues. Next, I present my methodology and the empirical basis for my examinations.

1.1 Research questions and arguments

The overarching research questions for the dissertation are as follows: Which technopolitical agendas lay behind the efforts to connect and protect

[12] ITU was established in 1865 when representatives from twenty European states gathered in Paris for an international telegraph conference, leading to the signing of the International Telegraph Convention of May 17 1865. Prior to this, bilateral and regional cooperation had taken place in Central and Western Europe since the late 1840s. For more, see Jacobsen, "Small Nation, International Submarine Telegraphy, and International Politics", p. 117; Codding, *The International Telecommunication Union*, p. 13f.

[13] "The North Atlantic Treaty", April 4 1949, article 3. NA-E.

telecommunications in NATO and Denmark during the Cold War, and how were telecommunications governed in terms of security?

As for the 'technopolitical agendas' that I aim to explore, I take inspiration from the concept of technopolitics. Technopolitics refer to the recognition that the design and development of technical systems can be used to enact political goals. This builds on the perception that technologies are shaped by political and social choices, resulting from a process in which technical capabilities and political possibilities define the scope of action.[14] In accordance with this approach, technologies and infrastructures like telecommunications can have political visions or agendas embedded in them in different ways, and it is my assumption that the same applies to the technical measures and systems introduced to secure communicate on networks. In asking how telecommunications were governed in terms of security, I refer to the process of 'governance' undertaken by both governments, institutions, and other actors exerting influence on a specific area. Studying governance implies that I do not limit my focus to political decisions, but also take into consideration the making and implementation hereof. I understand this as a process in which different actors interact, in this case military and civilian agencies in NATO, different national delegations, and – within Denmark – the Danish government, Danish ministries, the Danish Defence, and the telecom sector. In Denmark, this sector was structured as a hybrid between public monopoly and private service composed by the Postal and Telegraph Services (P&T) – a department under the Ministry of Public Works – and three 'private' telephone companies (of which the state however owned the majority).[15] The security governance of telecommunications, in other words, involved both politicians, military personnel, civil servants, business operators, and technicians.

By making technopolitics and security governance my main objects of study, I am able to reach an understanding of the security framework that surrounded telecommunications in NATO and Denmark during the Cold War. The choice of the two different settings, NATO and Denmark, allows me to explore how this process played out in both an international and a national context. NATO was a main organisational actor in Cold War Western European security in the period under study, while Denmark is an interesting case as a NATO allied, being – with the words of the Danish historian Nikolaj Petersen – "an exposed frontline state with severely constrained policy

[14] I base my understanding of 'technopolitics' on an analytical framework presented by the American historians Gabrielle Hecht and Paul Edwards. I shall get back to this in section 1.3.

[15] Through the dissertation, I will refer to the telephone companies as private companies, since they are typically labelled as such in the contemporary material. I shall elaborate on the status of the companies in chapter three and six.

options".[16] However, the national context will take up more pages in the dissertation. This is, on the one hand, caused by the circumstance that the securing of communications eventually happened in the member state. On the other hand, as I shall get back to later in this introductory chapter, it is also a consequence of the character of the available archive material, which allows me to explore the national context more thoroughly than the international context.

The dissertation overall shows how new aspects of the history of telecommunications come to the foreground when approaching the topic from the point of view of Cold War technopolitics and security governance. It is my main argument that political and technological developments in the Cold War period necessitated a new kind of security governance of the area of telecommunications. This was, on the one hand, a reply to the international defence cooperation among the NATO allies and the alliance's strategic developments, for which communications played a vital role. On the other hand, the Cold War preparedness agenda overall involved a broadening of the scope of telecommunications security, in terms of both objects, methods, and actors.

1.2 Telecommunications and the Cold War: Research overview

The topic of telecommunications and security governance in the Cold War has not yet received much attention in historical research. My examinations will primarily be based on empirical studies of archive material, of which a substantial part has not yet been used in historical research. Yet, I build upon a number of existing and expanding research fields rooted in both political history, the history of technology, and business history. In this section, I outline the insights from these historiographies that are important for my study and suggest how my work expands upon them.

My project falls within a pluralistic turn in Cold War research that has taken place in the decades following the end of the Cold War. Traditionally, the historiography on the Cold War has been divided into the three schools of traditionalism, revisionism, and post-revisionism; schools that have all arisen out of American research environments and analysed the Cold War primarily from a Western, in particular American, perspective.[17] However, in what could

[16] Petersen, "The Dilemmas of Alliance", p. 275.

[17] The traditional (or orthodox) school dominating the research agenda in the 1950s and 1960s understood the Soviet Union as an aggressive and the US as a defensive and reactive part in the conflict, whereas the revisionist school gained ground in the mid-1960s with a radically different critical view on American foreign policy. Since the 1970s, the release of new archive material has paved the way for a post-revisionism, which has drawn upon insights from both of the previous schools when conducting more thorough empirical studies. Although the schools have dominated different periods, main viewpoints from all of them remain present in Cold War research today. See Mariager,

be labelled as 'new Cold War history', these perspectives are being challenged, and, as the historian Federico Romero has observed, Cold War research today studies multiple actors in a "complex fabric of disparate interactions" – local, national, transnational, and global.[18] Furthermore, in this pluralistic turn, political and diplomatic history has profited from bringing in perspectives from other historical disciplines, and other areas than the customary ones of diplomacy, security, and ideology have gained attention. One of these is technology. Technology has long been recognised as an important factor in the geopolitical conflict, but the focus in research has primarily been limited to the 'flashy flagships' of nuclear weapons and space technologies.[19] In recent years, however, historians have paid increased attention to the role played by other technologies and to how Cold War tensions were manifest not only in global political disputes but also in technologies and technological practices.[20] Since my study is concerned with a technology that was already present when the Cold War began, but saw a rapid development through the following decades, it offers the opportunity to explore how a technology-in-use interplayed with the new geopolitical realities.[21]

With the broadened focus and the conceptualisation of a growing number of topics as 'Cold War issues', one can ask where the boundaries of Cold War research are to be drawn. Does the very notion of the Cold War

---

"Den Kolde Krig i international og dansk historieforskning", p. 720ff.; Westad, "Introduction: Reviewing the Cold War", p. 3f.

[18] Romero, "Cold War historiography at the crossroads", p. 687. See also Mariager, "Den Kolde Krig i international og dansk historieforskning", p. 723. An important contribution to the pluralistic turn in Cold War historiography is the three edited volumes of *The Cambridge History of the Cold War* published in 2010. On the background for this work and the need to place Cold War conflicts within the broader history of the twentieth century, see Westad, "The Cold War and the International History of the Twentieth Century".

[19] The point about the flashy flagships has been made by the American historian of science, Gabrielle Hecht, see: Hecht, "Introduction", p. 2.

[20] This is connected with the observation that the Cold War state in an unprecedented way became a patron for science and technology, since achievements in science and technology also became part of the superpower space race. See for instance Reynolds, "Science, technology, and the Cold War"; Hecht and Edwards, "The Technopolitics of the Cold War". On the call for increased focus on technology's role in the Cold War, see LaFeber, "Presidential Address: Technology and U.S. Foreign Relations"; Oreskes, "Introduction"; Westad, "The Cold War and the International History of the Twentieth Century", pp. 11-13; Hanhimäki and Westad eds., *The Cold War*, p. 273; Weinberger, "The Neutrality Flagpole".

[21] The notion of technology-in-use is a reference to the British historian of technology David Edgerton. Edgerton has called for historians to rethink the notion of technological time and break with innovation-centrism, stressing the majority of actors engaged in technologies have been concerned with operation and maintenance and not innovation. However, my analysis will not follow an Edgerton-inspired focus on things and users. See Edgerton, *The Schock of the Old*, p. xi.

risk being diluted?[22] For this purpose, the historian Akira Iriye has offered a clarification: To assign the central role to the Cold War in periodising post-Second World War history must be to consider geopolitics the key to recent history.[23] Put in another way, if the Cold War is to be understood as more than a historical period, research on Cold War history must bring the political-ideological conflict into the centre of the analysis. Accordingly, the choice of this dissertation to study telecommunications in a Cold War perspective builds on the assumption that my object of study was somehow intertwined with geopolitics, i.e. the East-West conflict. However, if studies of the Cold War are to extend into areas such as telecommunications, it is necessary to confer with new research fields.

Telecommunications

The understanding of telecommunications as intertwined with geopolitics is not new. 'Telecommunications' as a term has been in use since the beginning of the twentieth century and widely refers to different kinds of communication over distances such as telegraphy and telephony.[24] As an international research field, telecommunications history has been studied from many perspectives, but of particular interest for my examination are studies of the role played by telecommunications in international relations and the attempts made by governments and other actors to secure their communication facilities.[25]

The historiography on telecommunications and international politics has mainly been concerned with the 'formative period' of modern telecommunications, from the birth of electric telegraphy in the mid-nineteenth century paving the way for global communication networks to the first half of the twentieth century.[26] Historically, three groups of actors have fought over influence on global communications: States, businesses, and international

---

[22] This problematization has been raised by more scholars, see for instance: Nehring, "What Was the Cold War?", p. 924; Romero, "Cold War historiography at the crossroads", p. 687.

[23] Iriye, "Historicizing the Cold War", p. 15. See also Mariager, "Den Kolde Krig i international og dansk historieforskning", p. 740.

[24] According to the Swiss-Italian media scholar Gabrielle Balbi, the term was first coined in 1904 where it referred to all three telecommunication technologies available at the time: the optical and electrical telegraph and the telephone. Telecommunication became a term of common use in the 1920s and officially appeared in the name of the International Telecommunication Union (ITU) from 1932. Here, it first referred simultaneously to telegraph, telephone, and radio and later also to television, satellite, mobile phones, and the Internet. Balbi, "Telecommunications", p. 209. See also Huurdeman, *The Worldwide History of Telecommunications*, p. 3f.

[25] For a general research overview on the history of telecommunications, see Balbi, "Telecommunications"; Balbi and John, "Point-to-point".

[26] For the discussion on the character of the globalisation brought along by global telegraph networks, see Müller, "From Cabling the Atlantic to Wiring the World".

technical organisations such as the ITU.[27] A central topic in the historiography is the domination by the British empire in global communication networks and the French, German, and later American attempts to challenge this hegemony. The research field has not least been brought forward by the American historian Daniel Headrick, who in the 1980s characterised telecommunications as a "tool of empire" and in the early 1990s as an "invisible weapon" in international politics, stressing how flows of communications from the late nineteenth century onwards were perceived as a potential threat to national or imperial security and a dangerous weapon in the hands of potential enemies.[28] Building on this tradition, other scholars have since discussed the understanding of global communications as a site of struggle between the great powers of the pre-First World War world and the role of private corporations and technocrats in this regard.[29] One of the aspects that has been examined in this connection is the strategic necessity for states to protect their global telecommunications networks from enemy interference or sabotage, whether this has been done through physical security measures, by building redundancy into networks, or by attempting to control flows of information in different ways. The potential security risk of communication networks was not least underlined in the two world wars in the first half of the twentieth century, in which the military potential of modern communications was demonstrated.[30]

---

[27] Tworek and Müller, "Introduction", p. 407. The general tendency was that landline networks, besides in the United States, were primarily government-owned and submarine cable networks primarily controlled by multinational cable companies, although these were in different ways linked to nation states.

[28] Headrick, *The Tools of Empire*; Headrick, *The Invisible Weapon*. See also Headrick, "Strategic and Military Aspects of Submarine Telegraph Cables". For an example from Danish history, see Kurt Jacobsen's description of how being cut off from Britain during the dramatic events of 1864 led Danish decisionmakers to the conclusion that it was essential for the nation to control its own telecommunications: Jacobsen, "Small Nation, International Submarine Telegraphy, and International Politics", p. 119f.

[29] See for instance Hugill, *Global Communications Since 1844*; Hills, *The Struggle for Control of Global Communication*; Hills, "What's New?"; Hills, *Telecommunications and Empire*. For the discussion of whether the development of global communication networks until the early twentieth century was driven by business and technocratic interests more than state rivalry, see: Headrick and Griset, "Submarine Telegraph Cables"; Winseck and Pike, *Communication and Empire*; Laborie, *L'Europe mise en réseaux*; Müller, *Wiring the World*; Müller, "From Cabling the Atlantic to Wiring the World"; Tworek, "How not to build a world wireless network"; Tworek, *News from Germany*.

[30] As stressed by Winkler, the value and vulnerability of cables had indeed become manifest to the great powers by 1918: Winkler, "Bridging the Gap". For the role of the world wars, see Headrick, *The Invisible Weapon*, chapters 8-9, 12-13. For censorship as a control mechanism, see Hills, *The Struggle for Control of Global Communication*, pp. 15, 70ff. As for the First World War, Elizabeth Bruton has shown how the British global telegraph network known as the 'All Red Line' had multiple redundancies built into it and only landed at safe spots and therefore remained essentially uninterrupted during the war, whereas Britain quickly succeeded in cutting Germany's worldwide network.

The post-1945 period is far less explored in the literature on telecommunications history. Examinations directly linking developments in communications technologies to the Cold War conflict have generally focused on computers, radio broadcasting, and signal intelligence.[31] Moreover, scholars have studied international telecommunications as an arena for exerting Cold War diplomacy. Focusing on the governance of international communications in the ITU, Léonard Laborie has studied how collaboration within the organisation was hampered by the new geopolitical circumstances.[32] Drawing on developments both within ITU and in other forums, Jill Hills has studied US attempts to breach state sovereignty and create an international US telecommunications empire, while Hugh Slotten has concentrated specifically on US soft power diplomacy in the area of satellite communications.[33]

Turning the focus to the national level, developments in telecommunication sectors have mainly been studied from the perspective of business history paying particular attention to the long-standing competition between public and private management of communications.[34] As for the Cold War years, previous research has suggested that the importance that postal, telegraphy, and telephony (PTT) services had for national security allowed governments to tighten their hold on them, but this relation has yet to be scrutinised in research.[35] Literature on Danish communication history has mainly studied the sector from an internalist point of view paying special attention to organisational and institutional aspects.[36] The Danish telecom

---

Bruton, "The Cable Wars". For more on cable protection, also in the Cold War era, see Starosielski, *The Undersea Network*.

[31] See for instance Edwards, *The Closed World*; Abbate, *Inventing the Internet*; Hecht and Edwards, "The Technopolitics of the Cold War"; Reynolds, "Science, technology, and the Cold War"; Badenoch et al. eds., *Airy Curtains in the European Ether*; Risso, "Radio Wars"; Aid and Wiebes, "Introduction on The Importance of Signals Intelligence in the Cold War"; Hills, "What's New?", p. 201f.

[32] Laborie, "A Missing Link?", p. 188; Laborie, "Fragile links, frozen identities", p. 313; Beyersdorf, "Freedom of Communication".

[33] Hills, *Telecommunications and Empire*; Slotten, "International Governance, Organizational Standards, and the First Global Satellite Communication System"; Slotten, "The International Telecommunications Union, Space Radio Communications, and U.S. Cold War Diplomacy". For more on satellites or cable diplomacy in the Cold War, see also Ward, *Information and Control*; Dizard, *Digital Diplomacy*; Starosielski, *The Undersea Network*.

[34] Balbi, "Telecommunications", pp. 209, 217.

[35] This argument has been brought forward by both Robert Millward and David Reynolds, see: Millward, "Business and the State", p. 546; Reynolds, "Science, technology, and the Cold War", p. 390.

[36] The history of the Danish Postal and Telegraph Services has been analysed in the five volumes of *P&Ts Historie* published in the early 1990s. For the period under study in this dissertation, see Blüdnikow, *Post og Tele under samme tag* and Johansen, *Fra monopol til konkurrence*. The history of the private, regional telephone companies has been documented in publications stemming from or supported by the companies

arrangement has been characterised as a hybrid between public monopoly and private service with competing agendas of nationalisation and privatisation, and the fact that the sector, despite several attempts, was not reorganised before the end of the Cold War has been explained with the concept of 'path dependence'.[37] The strong focus on explaining the inner workings of the sector means that there are only few examples of studies using the Danish telecom sector as a case study for a broader research agenda. These studies have focused on wars, security, and surveillance with a predominant focus in time on the two world wars.[38]

It still remains to be examined how the Cold War influenced Danish telecommunications.[39] The role of the Danish telephone companies in the Cold War intelligence apparatus has been examined as part of a major investigation of the Danish Security and Intelligence Service (Politiets Efterretningstjeneste, PET) during the Cold War, which was initiated by a parliamentary decision in 1999 and published in 2009.[40] Moreover, as mentioned previously, a few studies have briefly touched upon specific security arrangements for communications in Denmark during the Cold War, but only

---

themselves. See Jacobsen, *Jydsk Telefon*; Birch, *Linjer af Jydsk Telefons 100 årige historie*; *KTAS i hundrede år*.

[37] Ibsen and Skovgaard Poulsen, "Path dependence and independent utility regulation"; Jacobsen, *Jydsk Telefon*, pp. 14ff.; Blüdnikow, *Enhedsvæsenet*, p. 113; Andersen, *Omstillingen er klar*; Henten, *100 års telefonlov*; Henten, "Dansk telefonhistorie"; Olsen, *Regulering af offentlige forsyningsvirksomheder i Danmark*, p. 271ff. For comparative Scandinavian studies, see Jeding et al., "Regulatory change and international co-operation"; Rinde, *Kontingens og Kontinuitet*.

[38] See in particular Andreas Marklund's research on the collaboration between the telecom sector and the state on surveillance, censorship, and other kinds of control mechanisms: Marklund, "A Stake in Public Confidence"; Marklund "Suspekte beskeder"; Marklund, "Listening for the state"; Marklund, "Global Peace and Bolshevik Agitation". For the Second World War, see the 2007 PhD dissertation analysing the Danish telecom sector during the German Occupation, including the wartime censorship: Mau, *Kampen om telefonen*. The same topic has earlier been explored in Blüdnikow, *Post og Tele under samme tag*, p. 333f. For new perspectives on surveillance and wiretapping, see Nielsen, *Er der nogen på linjen?*; Marklund "Trawling the Wires". Moreover, Kurt Jacobsen has used the Great Norterh Telegraph Company as a case study of small state diplomacy, see Jacobsen, "Small Nation, International Submarine Telegraphy, and International Politics".

[39] However, I have previously conducted two studies that must be mentioned in this connection. One is my 2013 unpublished master's thesis, which was a preliminary study to this PhD project. In the thesis, I examined how telecommunications were 'securitized' in the early Cold War years. Moreover, in a 2017 article I studied NATO's engagement with the concept of infrastructure in the 1950s and also drew upon examples from Denmark. In this dissertation, I bring in a few of the empirical cases that I also dealt with in these previous studies, but my analytical focus is different. See: Jensen, *Klartone efter atombomben*; Jensen, "Connecting the Alliance".

[40] See Schmidt and Miller, *PET's virkemidler*, p. 163ff.

as a short mentioning in examinations with another focus.[41] An important source of inspiration for this dissertation is a 2005 three-volume publication on Norwegian telecommunication history, in which the examination of the Cold War period by the Norwegian business historian Harald Espeli pays special attention to how Cold War geopolitics and the NATO membership influenced the Norwegian telecom sector. Espeli suggests that lack of civilian-military collaboration in Norway became a decisive factor for the backlog in Norwegian telecom developments in the second half of the twentieth century.[42]

Technologies, infrastructures, and the nuclear threat

This dissertation falls within a turn in the historical research on technologies and infrastructures. In the last two decades, the traditional focus on national perspectives and internal logics of infrastructural and technological systems has been challenged by scholars paying increased attention to transnational and political aspects.[43] This turn has for instance caused historians to rethink the history of European integration through the lens of transnational infrastructures and technologies, thereby introducing a 'making Europe' narrative.[44] In this regard, transnational connections of infrastructures and technologies have been understood as an alternative or 'hidden' European integration process, fostering both concrete manifestations and visions of 'Europe'.[45] An important work to mention in this regard is the 2016 book *Europe's Infrastructure Transition* written by Per Högselius, Arne Kaijser, and Erik van der Vleuten. The book outlines how nineteenth and twentieth century European infrastructures have both been integrative and divisive and how different system-builders and border-builders with different agendas have shaped and reshaped Europe as a geographical entity – all of which has had far-reaching

---

[41] See: ibid., p. 186; Jensen, *Ulve, Får og Vogtere 2*, p. 249f; Pedersen and Pedersen, *Danmarks Dybeste Hemmelighed*, pp. 153f., 328f.; Stevnsborg, *Magt, krig og centralisering*, p. 257. I shall get back to this in chapter five.

[42] See Espeli, *Det statsdominerte teleregimet*, p. 273ff.

[43] For the criticism that history of technology has been suffering from national bias and neglect of politics and for the call for a new, transnational perspective, see, i.a. van der Vleuten and Kaijser, "Prologue and Introduction", p. 8.

[44] This research agenda is closely connected with the Foundation for the History of Technology's project, 'Tensions of Europe', which began in 1998 (see https://www.tensionsofeurope.eu/). On the call for a new research agenda, see Misa and Schot, "Introduction: Inventing Europe". An important result of this agenda is the six volume book series *Making Europe: Technology and Transformations, 1850-2000* (2013-2018). The narrative is presented in the common introduction to the series, see for instance Högselius et al., *Europe's Infrastructure Transition*, p. xii.

[45] Misa and Schot, "Introduction: Inventing Europe"; Badenoch and Fickers, "Europe Materializing?"; Schipper and Schot, "Infrastructural Europeanism"; Kaiser and Schot, *Writing the Rules for Europe*; van der Vleuten and Kaijser eds., *Networking Europe*.

implications for political developments in Europe, both in terms of military planning and European integration.[46]

This transnational turn is noteworthy as regards my study of NATO's telecommunications infrastructure which was, exactly, transnational, as it crossed national borders, connected allied territories, and furthered circulation of information. The 'networking' of the NATO allies still constitutes a lacuna in historical research. In general, however, the number of large transnational technological projects in Europe increased dramatically in the Cold War period, and the attempts among NATO allies to connect existing and establish new infrastructural systems must therefore be understood as part of a larger, contemporary trend.[47] Thomas J. Misa and Johan Schot have suggested to "interpret the Cold War as a massive de-linking and relinking of transport, energy, and communication infrastructures in the very middle of Europe".[48] Building on this, Erik van der Vleuten and Arne Kaijser have stressed how the technological network building that took place in Europe in the post-war years intertwined with the emergence of an Eastern and a Western block divided by the Iron Curtain. Therefore, they argue, it is important to pay attention to how the 'network builders' behind this process – e.g. NATO – were products of the Cold War themselves.[49]

Another important perspective in the newer historiography of Europe's technology and infrastructure is the understanding of infrastructures as 'critical'. Critical infrastructures have become a growing security concern since the 1990s, but with 'critical infrastructure' as a lens, recent historical and social science research has traced both the 'criticality' of infrastructures and the governance of infrastructures as vulnerable back in time.[50] In this regard, the 2013 research anthology *The Making of Europe's Critical Infrastructure* points towards the role of 'critical events' such as accidents or breakdowns in shaping understandings of infrastructure vulnerabilities by making risks more tangible. Moreover, the editors call attention to the interests of stakeholders in either de-emphasising vulnerabilities or framing some infrastructures as particularly

---

[46] Högselius et al., *Europe's Infrastructure Transition*, pp. 3ff. Another volume in the same series is expected later in 2018: Fickers and Griset, *Communicating Europe*. This book analyses the role and function of Europe's information and communication systems in shaping European spaces since 1850. For an examination of broadcasting with a similar approach, see Badenoch et al. eds., *Airy Curtains in the European Ether*.

[47] Trischler and Weinberger, "Engineering Europe"; Högselius et al., *Europe's Infrastructure Transition*, p. 225.

[48] Misa and Schot, "Introduction: Inventing Europe", p. 9.

[49] van der Vleuten and Kaijser, "Networking Europe", p. 36.

[50] For contemporary perspectives, see Aradau, "Discourse/materiality"; Aradau, "Infrastructure"; Aradau, "Security that Matters". For an attempt to historicise information technologies along these lines, see Jackson, "Rethinking Repair".

critical.[51] On a different note, the media scholar Nicole Staroselski has in a study of submarine cables and 'disruption narratives' noted how such narratives reflect the dominant cultural fears of the time: In the telegraph era, breakdowns were traced back to the natural environment that threatened technological progress; during the Cold War, disruptions were coded as external aggression produced by hostile actors.[52] The historicization of the perception and governance of critical infrastructures is important for this dissertation, given my aim of understanding the attempts to secure communications infrastructure during the Cold War in a wider technopolitical context.

Since the Cold War remained cold, at least in a Western European setting, it can be referred to – as I did in the first pages of this chapter – as an era of preparedness. The British historian Matthew Grant has emphasised how preparing for nuclear war was "an obvious and natural consequence of taking part in the Cold War".[53] Such preparedness initiatives were based on an imagination or forecasting of the nuclear apocalypse and were part of what Mats Fridlund has referred to as "nuclearmindedness" – i.e. the way of coping with the nuclear threat during the age of 'atomic anxiety'.[54] The coping with the threat took place on both political and individual levels and found many expressions, e.g. in civil defence measures and in arrangements ensuring the functioning of governments and civil services in wartime. International research into these aspects has also pointed in many directions, highlighting both cultural, material, and political aspects hereof.[55] Important for this dissertation

---

[51] Högselius et al. eds., *The Making of Europe's Critical Infrastructure*. See in particular van der Vleuten et al., "Europe's Critical Infrastructure and Its Vulnerabilities", p. 6f.; Hommels et al., "Europe's Infrastructure Vulnerabilities", p. 266ff. Similar considerations can be found in contemporary cyber security studies, where scholars point towards the critical role played by 'cyber doom scenarios' or the mobilisation of the 'specter of the future' in national security discourses, see Christensen, *Corporate Zones of Cyber Security*, p. 34; Hansen and Nissenbaum, "Digital Disaster, Cyber Security, and the Copenhagen School", p. 1164.

[52] Starosielski, *The Undersea Network*, p. 67.

[53] Grant, *After the Bomb*, p. 3. In this connection, the British historian Peter Hennessy has used the notion of the 'secret state' to explain the British Cold War state's engagement in imagining and planning for unthinkable nuclear scenarios. Hennessy, *The Secret State*, pp. 2-3.

[54] Fridlund, "Buckets, bollards and bombs", pp. 397, 402f. The imagining of risks has moreover been explored in research on Cold War exercises, see Davis, *Stages of Emergency*, p. 2ff.; Erickson and Barrat, "Prudence or Panic?".

[55] Aspects of civil defence has i.a. been explored as a way of domesticating or privatising the Cold War, or, put in another way, as a militarisation of everyday life. Research into this has in particular focused on USA in the 1960s, see for instance Oakes, *The Imaginary War*; McEnaney, *Civil Defense Begins at Home*; Rose, *One Nation Underground*; Garrison, *Bracing for Armageddon*. For a Danish perspective on the emotional aspects, see Sylvest, "Atomfrygten og Civilforsvaret". For material aspects, see for instance Ziauddin, "Superpower Underground". In Swedish research, the civil defence has been linked with wider societal developments, see Cronqvist, "Survival in the Welfare Cocoon"; Cronqvist, "Utrymning i folkhemmet".

is a study carried out by the social scientists Stephen J. Collier and Andrew Lakoff, who have linked critical infrastructure perceptions to the Cold War total preparedness agenda. Examining the American context, Collier and Lakoff argue that 'system-vulnerability' was constituted as an object of thought among US security actors through the Cold War period, for which reason total preparedness evolved to be a national security problem in its own right rather than being directly related to the dealing with the Soviet threat.[56] Collier and Lackoff's study has its empirical limitations, as it is confined to a selection of policy documents prepared by US civil defence actors. However, it points toward a still quite unexplored development in Cold War preparedness planning, which is central to this dissertation, namely the emergence of a broader security framework.[57]

In Danish historiography, the Cold War civil preparedness and total defence is still a virginal field. A few historians have used the preparedness initiatives beginning in the 1950s to demonstrate the threat perceptions of that time.[58] Moreover, a handful of examinations have studied the material and organisational aspects of the total defence, including the civil-military balances.[59] With a view to today, the main challenge in preparedness planning in the cyber area is how to involve the private sector.[60] This challenge is brought about by the privatisation of communications services that has taken place since the late Cold War years, but the involvement of private businesses in the planning for wartime has a longer history. This is still a virginal field in historical research, but business historians have recently begun studying how the Cold War doctrine of total war have caused states to regulate particular industries in different ways, thereby both occasioning and restraining business opportunities.[61] This dialectic between commercial vis-à-vis state security

---

[56] Collier and Lakoff, "The Vulnerability of Vital Systems".
[57] In another article, Collier and Lakoff have coined the term 'distributed preparedness' in order to describe the domestic logic of domestic security that emerged in the United States during the Cold War. See Collier and Lakoff, "Distributed Preparedness".
[58] Jensen, *Ulve, Får og Vogtere 2*, p. 217ff., 274ff.; Lidegaard, *I Kongens Navn*, p. 579; Villaume, *Allieret med Forbehold*, pp. 525, 542.
[59] Stevnsborg, *Magt, krig og centralisering*, p. 241ff.; Petersen and Jacobsen, "Totalforsvaret og det civile beredskab"; Pedersen, "Det totale forsvar til den totale krig"; Pedersen, "Beskyttelsen af civile". For examinations of physical constructions related to civil preparedness, see Stenak et al. eds., *Kold Krig*; Pedersen and Pedersen, *Danmarks Dybeste Hemmelighed*. I shall get back to these research discussions in chapter five.
[60] See for instance Christensen and Petersen, "Public–private partnerships on cyber security"; Christensen, *Corporate Zones of Cyber Security*. By comparison, Hennessy has noted that it was more simple to exert command over public corporations during the Cold War. Hennessy, *The Secret State*, p. 371.
[61] For the latter, a study by the Swedish historian Magnus Linnarsson has demonstrated how the Swedish state kept a company producing rayon 'alive' due to its wartime importance. See Linnarsson, "Rayon för rikets försörjning". In a recent research overview, Erik Lakomaa calls for further research into this area: Lakomaa, "The history of business and war: Introduction". Apart from that, previous research on Cold War

interests in Cold War preparedness is noteworthy – not least with a view to the telecommunications sector in which, as shown above, the public-private division of responsibility has exactly been a key component. By examining how preparedness planning played out in a specific societal sector in Denmark, addressing both civil-military and public-private aspects, this dissertation will provide new perspectives to these issues.

Cold War alliance politics

Another central field of research for this examination is the historiography on NATO during the Cold War. This has first and foremost been concerned with deterrence and defence issues such as the development of the alliance's military strategies. Furthermore, topics of 'high-level politics' have been explored, for instance transatlantic relations and NATO's navigation in the international crises that played out during the Cold War.[62] Studies hereof have been based on records from national archives and on what has so far been publicly disclosed from the NATO Archives since its opening in 1999. A central debate among NATO scholars has revolved around the level of American influence; shall NATO be interpreted as an extension of American foreign policy or as an organisation with a 'will of its own'?[63] However, parallel to the pluralistic turn in Cold War research and further to an increased attention to the history of international organisations, newer research on NATO has taken on a broader understanding of the alliance. Here, NATO is increasingly examined as a multilateral political forum or even as a 'value-oriented union' which played an

business history has mainly focused on the direct participation of businesses in defence industries, for instance in the construction of new military facilities, see Andersen, "Erhvervslivet", p. 216; Reynolds, "Science, technology, and the Cold War", p. 383.

[62] Important for the historiography of NATO is the American historian Lawrence S. Kaplan who has contributed with several analyses of NATO both during and after the Cold War. See for instance Kaplan, *The United States and NATO*; Kaplan, *The Long Entanglement*; Kaplan, *NATO Divided, NATO United*. Among other central early accounts of NATO's history are: Park, *Defending the West*. Newer contributions on NATO's history based on archival material include the three-volume work published in the wake of NATO's fiftieth anniversary, Schmidt ed. *A History of NATO*, as well as the German 13 volume publication *Entstehung und Probleme des Atlantischen Bündnisses*, edited by Militärgeschichtliches Forschungsamt and published in the years 1998–2018, see for instance Greiner et al., *Die NATO als Militärallianz*. Also, the Parallel History Project on NATO and the Warsaw Pact (see www.php.isn.ethz.ch) has produced important research on NATO, see for instance Wenger et al. eds., *Transforming NATO in the Cold War*; Mastny et al. eds., *War Plans and Alliances in the Cold War*.

[63] Risso, "NATO and the Environment", p. 535. Risso suggests that neither narrative is exact and that NATO instead should be understood as an 'organised controversy'. The debate was initiated in 1970, when David Calleo described NATO as an American protectorate: Calleo, *The Atlantic Fantasy*, p. 24ff.

important role in forging the Cold War West. In this way the research focus has shifted away from the formerly predominant 'crisis perspective'.[64]

In recent years, historians have also begun looking into NATO's collaboration in areas beyond high-politics, for instance in non-military fields such as science and technology. Cooperation in these areas has been interpreted in research as attempts to foster support, coherence, and political stability within the alliance.[65] Important in this regard is the work by John Krige, who has demonstrated how NATO's scientific and technical cooperation, along with the general reconstruction of science in post-war Europe, was an instrument of American soft power and a tool of American hegemony.[66] The cooperation on communications in NATO is only scarcely explored and only in relation to nuclear command and control systems.[67] In general, NATO's member states invested heavily in common infrastructures and other large technological projects to facilitate Western European security, but much is yet to be discovered when it comes to NATO's role as a system-builder in Western Europe and the American-European power balance in this regard.[68]

However, previous studies have also highlighted challenges associated with examining NATO's history. These are related to the general methodological challenge of studying the history of international organisations

---

[64] Risso, *Propaganda and intelligence in the Cold War*, p. 2-7; Hatzivassiliou, *The NATO Committee on the Challenges of Modern Society*, p. 5. The 'crisis perspective' has been identified by Geir Lundestad: Lundestad, *No End to Alliance*; Lundestad, *Just Another Major Crisis*.

[65] See for instance Turchetti, "Sword, Shield and Buoys"; Turchetti and Roberts eds., *The surveillance imperative*; Cantoni, "What's in a Pipe?". Moreover, a growing research field in these years is NATO's environmental cooperation, see: Turchetti, *Greening the Alliance*; Risso, "NATO and the Environment"; Hatzivassiliou, *The NATO Committee on the Challenges of Modern Society*; Hamblin, "Environmentalism for the Atlantic Alliance".

[66] Krige, *American Hegemony*; Krige, "NATO and the Strengthening of Western Science"; Krige, *Sharing knowledge, Shaping Europe*. For an analysis of US technological collaboration with a non-NATO country, Sweden, as an act of hegemony, see Nilsson, "Amber Nine", Nilsson, *Tools of Hegemony*. On soft power and science in the Cold War in general, see also Doel, "Scientists as Policymakers"; Aronova and Turchetti, "Introduction: Science Studies in East and West"; Oreskes, "Science in the Origins of the Cold War". US soft power has also been analysed through the lens of 'Americanization', see for instance Sørensen, "Amerikanisering".

[67] Gregory, *Nuclear Command and Control in NATO*, pp. 43f., 63f.; Carter, "Communications Technologies", p. 244; Wentz and Hingorani, "NATO Communications in Transition". An exception is my aforementioned article on NATO's infrastructure cooperation in the 1950s, see Jensen, "Connecting the Alliance".

[68] One of the NATO systems that has been examined in detail is the NATO Air Defence Ground Environment (NADGE), an early warning system developed in the 1950s. See: Högselius et al., *Europe's Infrastructure Transition*, p. 211f.; Trischler and Weinberger, "Engineering Europe", pp. 60ff.; Gough, *Watching the Skies*. For the discussion of NATO's role as a European system-builder, which I shall get back to in chapter four, see: Trischler and Weinberger, "Engineering Europe", p. 74; Högselius et al., *Europe's Infrastructure Transition*, pp. 14, 215ff.

and reckon these as multilateral political forums when doing so. Historians must, as Linda Risso has pointed out, take into account a wide range of perspectives such as the institutional development of the organisation, the role of personalities, the changing geopolitical climate, and the developing priorities of member states.[69] The choice of this project to study both the central level of NATO's political forums and agencies and different settings in one of the member states, Denmark, builds on the assumption that important insights are to be gained by closely following the multilateral political interaction and the practical implementation of NATO policies in the area of telecommunications. This is done with inspiration from newer historiography on international organisations, which focuses on processes of transnational governance in relation to these organisations rather than their setting up and internal developments.[70]

Lastly, I shall make a short mentioning of the existing research on Denmark and NATO. In Danish Cold War historiography, both the Danish integration into the alliance and the character of the Danish alliance politics have been explored. The first thorough examination hereof was Poul Villaume's 1994 doctoral thesis *Allieret med Forbehold* investigating the period from 1949 to 1961.[71] Villaume's work gave rise to a debate among Danish historians on the character of Denmark's alliance policy, e.g. how the low defence expenditures and the reservations about hosting foreign troops and nuclear weapons on Danish soil in peacetime are to be understood vis-à-vis Denmark's liabilities and loyalty towards the alliance.[72] A central point in these discussions regards the driving forces in the formulation of the Danish alliance policy. Here, it has been suggested that Danish politicians were motivated towards not provoking the Soviet Union; that domestic political agendas played an important part in formulating the alliance policy; or that the relation to the

---

[69] See Risso, *Propaganda and intelligence in the Cold War*, p. 4.

[70] See for instance Duedahl and Gram-Skjoldager, "De Internationale Organisationers Danmarkshistorie. En introduktion", pp. 7-11; Christensen and Ydesen, "Internationale Organisationers Virkningshistorie"; Sluga, "Editorial - the transnational history of international institutions".

[71] The thesis was published as a book in 1995 and still constitutes the most detailed examination of the political processes regarding Denmark's integration into NATO. Prior to Villaume's examination, Nikolaj Petersen had characterised the Danish NATO policy up to 1961 as a policy of adaptation, but Villaume, by contrast, accentuated how the Danish NATO policy – with the purpose of maintaining Denmark and its neighbouring area as a low-tension area – in more areas was characterised by reservations towards the common NATO standpoint. See: Villaume, *Allieret med Forbehold*, p. 843ff.; Petersen, *Denmark and NATO 1949-1987*, p. 14ff. Villaume has later used the term of a "loyal allied with reservations", stressing that Denmark was firmly rooted in NATO and perceived as so, but had relatively more political-military reservations than most other NATO allies. See: Villaume, "Nato og Danmark 1949-72", p. 445.

[72] For an overview of the positions in this debate, see Mariager, "Den Kolde Krig i international og dansk historieforskning", p. 732ff.

alliance and the allies was the overriding priority.[73] However, previous research has also highlighted how Denmark in other areas of allied cooperation was influential and even agenda-setting, for example in the intelligence cooperation, in promoting non-military cooperation, and as regards NATO's relation with the Eastern bloc.[74] Still, given the strong focus on political-military dilemmas attached to the Danish NATO membership, many aspects of what we could call 'low policy' such as the technological cooperation are still unexplored.[75] In particular, Denmark's participation in NATO's more specialised agencies and the character and incentives hereof needs to be further investigated. However, it is not the main objective of this dissertation to evaluate the character of Danish alliance politics, also not in the specific area of telecommunications. Instead, I aim to take a new approach by focusing on what it meant for a specific societal sector to become involved in the NATO cooperation.

To sum up, the different research contributions discussed above all inform my analysis. It is a deliberate choice to draw upon insights from all of these fields of research, since I believe that the historiography of the Cold War can profit significantly from including studies of infrastructure and technology – and vice versa. Due to the vital role played by telecommunications in all societal sectors, civilian as well as military, the area of communications makes up a rewarding case for studying the interaction between political and technological factors in Cold War preparedness planning.

1.3 Research focus and strategy

Before presenting how I intend to carry my examination through, it is necessary to define – and delimit – the scope. The spatial focus of my research is

---

[73] As regards the former, Bent Jensen has interpreted the Danish security policy as being indulgent towards the Soviet Union: Jensen, *Bjørnen og haren*; Jensen, *Ulve, Får og Vogtere 1*. By contrast, the domestic context has been emphasised by Villaume, *Allieret med Forbehold* and Petersen, *Denmark and NATO 1949-1987*, whereas the latter argument was the overall conclusion of an inquiry about Denmark's security policy situation during the Cold War, initiated by the Danish parliament in 2000 and published in 2005, see *Danmark under Den Kolde Krig*. A profound analysis of Danish foreign policy during the Cold War can be found in volume 5 and 6 of *Dansk Udenrigspolitiks Historie*, see Villaume and Olesen, *I Blokopdelingens Tegn*; Petersen, *Europæisk og Globalt Engagement*.

[74] For intelligence, see Schmidt and Miller, *PET's virkemidler*, p. 42f., 75f., 83f. Villaume and Olesen, *I Blokopdelingens Tegn*, pp. 228-229. For the latter, in particular related to the 1966-1967 Harmel process, Villaume, "Nato og Danmark 1949-72", p. 444; Villaume and Olesen, *I Blokopdelingens Tegn*, p. 587ff.; *Danmark under Den Kolde Krig*, bind 2, p. 171f.; Villaume, "Harmel-rapporten".

[75] Villaume and Olesen, *I Blokopdelingens Tegn*, p. 229. An exception is a short mentioning of Danish participation in NATO's scientific cooperation in Knudsen and Nielsen, "Naturvidenskab i Danmark under Den Kolde Krig", p. 450f. For considerations on low policy aspects of Danish alliance policy, see Villaume, *Allieret med Forbehold*, p. 19.

NATO's Western European territory with a particular emphasis on Denmark. Thus, NATO's North American or Atlantic territories, including Greenland, will not be included. Although I do allocate attention to some national cases when relevant, I do not go into depth with other national spaces than the Danish one and do not aim for comparative analyses. This decision is necessary, since telecommunications emergency planning during the Cold War is still a virginal field of research. A comparative perspective bringing in cases from more national settings would therefore require thorough explorations of archive material from different countries. Although I have been tempted to do so, it would have the consequence that I would have to limit my examinations in another sense, by focusing on a shorter time period and paying less attention to wider societal implications of emergency planning in the field of telecommunications.

As for the time frame, my examination covers the entire Cold War period, from the signing of the Atlantic Treaty in 1949 to end of the Cold War in the years around 1990. It is debatable when the Cold War began, but by 1949 it was a reality and the partition of Europe was settled. Although the post-war reconstruction of Western European security, including considerations on the role of telecommunications, began before 1949, the catalysing events of that year serve as a good starting point for my analysis: In 1949, first of all, twelve Western nations joined forces with the signing of the Atlantic Treaty leading to the creation of the North Atlantic Treaty Organisation and, second, as the USSR tested a nuclear bomb, the US monopoly on nuclear weapons was broken. The end point of 1990, on the other hand, is more round-edged, since the end of the Cold War was more of a transition process.[76] The decision to study the entire Cold War period is made with the ambition of covering the diachronic developments that took place. A diachronic perspective is useful when trying to understand the entanglements of political and technological developments, since a discrepancy or 'delay' in time between the two might occur, given the circumstance that planning and execution of large technological projects are typically long-term processes.[77]

This has the consequence, however, that my examination will be less detailed in some ways. As such, this study does not intend to give a full chronological account of the development in telecommunications security from 1949 to 1990. Instead, I pay particular attention to cases which I consider

[76] A number of events marked the end of the Cold War: In 1989 the electoral triumph of Solidarność in Poland and the fall of the Berlin wall, in 1990 the reunification of Germany, and in 1991 the dissolution of the Soviet Union.

[77] Regarding the temporal aspects of infrastructures, Paul Edwards has emphasised how infrastructures chiefly exist in "historical time" as they develop at another speed than other societal processes. This speaks against studying infrastructures in a too narrow temporal perspective. See Edwards, "Infrastructure and Modernity", p. 194f.

to be of wider importance for the Cold War security governance of telecommunications and leave unmentioned the more particular examples of how Cold War preparedness planning in the area of telecommunications took shape. Furthermore, another consequence is that the long period leaves behind a disproportion as regards the available source material. As I will elaborate on later, the extent of the source material from the last part of my period is smaller and the material is more fragmented. The reader will notice that I pay much attention to the security initiatives that were launched in the 1950s, both when studying developments in NATO and in Denmark. The reason for this is that many of the measures taken and projects initiated from the 1960s onwards had roots in the initiatives launched in the first decade of the Cold War. In order to understand the later developments and the technopolitics at play, it is necessary to look into the background. Indeed, as the dissertation will demonstrate, the construction of security systems of communications is a 'layered' process, in which existing systems are continuously extended, upgraded, and improved. Since this kind of technological system-building is a long-term process, I will not structure my examinations along the traditional periodization of the political developments in the Cold War, but along the technopolitical developments that I identify.

The main object of my research, telecommunication, calls for a clarification too. Gabriele Balbi has identified three elements that distinguish telecommunications from other technologies of communication over distances (such as transport systems, postal services, broadcasting radio or television). First, telecommunications are one-to-one communications as they transmit messages from one point in space to another. It follows from this that telecommunications differ from means of mass communication, since they transmit unique, in contrast to uniform, messages between two social units instead of from one social unit to a large number of social units. Second, telecommunicating means sending a message without the physical transportation of the message. And third, telecommunication networks are interactive as they allow people or institutions to reply to the received messages.[78] In my examinations, I understand telecommunications as the technical systems allowing transmission of messages to take place, i.e. both the technological devices, in my case primarily telephones and teleprinters, the technology that lies behind, i.e. the practical application of scientific knowledge, and the infrastructure that enables the communication of messages, in my case cables, radio chains, or satellites and facilities such as repeater stations and exchanges. For clarification, it is necessary to mention that my examination does not concentrate on the content, the information passing through the telecommunications infrastructure. Moreover, I do not consider neither data

[78] Balbi, "Telecommunications", p. 209.

switching networks, i.e. early versions of the Internet, nor military signal services used by fighting forces for tactical and operational communications. These choices rely on my interest in the overlap with civilian and public communications and thereby with the society in a broader sense.

Furthermore, it is important to clarify that my dissertation is not concerned with surveillance or signal intelligence. Signal intelligence (SIGINT) refers to the gathering of enemy signals through different means of surveillance. Since my focus is on NATO's internal communications infrastructure and the security hereof, intelligence directed towards the enemy is not within my scope. Obviously, the prospect of enemy interception of allied communications plays a key role for how the security of internal communications is orchestrated, but an examination of surveillance counter measures would entail an analysis of communications security understood as protection of contents through encryption etc. Since my focus is on telecommunications infrastructure rather than contents of information, I only consider such aspects when they have an influence on infrastructural matters, for instance when the risk of enemy interception is used to problematise or renew existing infrastructure. Moreover, I do not focus on the participation of the tele sector in security measures directed towards the inner enemy, such as for instance wiretapping.[79] Lastly, the dissertation does not examine the preparedness planning in the area of public information, e.g. civil defence warning systems and the participation of the press in the 'psychological defence' in case of war. Such systems however relied on the general emergency planning in the area of communications.[80]

Analytical framework

In order to present the analytical framework that I draw on in the dissertation, I find it useful to make a short mentioning of one of the cases from the source material. The case in point is an extensive emergency plan to be carried out in the Danish telecom sector, agreed on by the Danish government in the late 1950s and later known as the '60 million kroner plan'. The plan involved a number of investments in the Danish telecom infrastructure in order to make it more resistant, for example by relocating the switching nodes for inter-urban traffic that were placed in Denmark's two largest cities, Copenhagen and Aarhus.

As mentioned previously, I take inspiration from the analytical concept of 'technopolitics' in order to explore how both technological and political factors shaped attempts to provide secure telecommunications such as the 60

[79] For the Danish context, this aspect has been examined in Schmidt and Miller, *PET's virkemidler*, p. 168f.; Schmidt, *PET's Overvågning af Arbejdsmarkedet 1945-1989*, p. 253.

[80] For more on this, see Jensen, *Ulve, Får og Vogtere 2*, p. 260f.; Høj et al., *Tryghed på tryk*; Pedersen, "Presseberedskabet under Den kolde krig".

million kroner plan. The American historians Gabrielle Hecht and Paul Edwards have defined technopolitics as "the strategic practice of designing or using a technology to enact political goals."[81] Hecht and Edwards have used the concept to gain new insights into Cold War nuclear and computing technologies, but I shall suggest that the concept has wider analytical application. For my purpose, technopolitics can help illuminate how technological artefacts and infrastructures like telecommunications can have political visions embedded in them in different ways. When studying technological systems of telecommunications, they will often not appear political at first sight. For instance, much of the source material related to the 60 million kroner plan is concerned with specific technical calculations and considerations. However, what appears to be the solution to a technological challenge is also a process in which different actors have contributed and choices and rejections have been made. Hecht and Edwards have argued that the design and use of a technology is a process of "mutual orientation". This builds on the observation that when political actors work with engineers or designers to solve problems – even when this cooperation happens indirectly, for instance when it is mediated through institutions – they orient each other to particular solutions: Emerging technical capabilities both create and constrain political possibilities, and, at the same time, technical capabilities expand and take on directionality to the extent that they acquire political support and effectiveness. In this way, technopolitical processes do not just result in politically constructed technologies.[82]

The drafting of the 60 million kroner plan can very well be understood as a mutual orientation process involving political actors, military actors, and technical experts from the telephone sector each making use of their different competences and powers. The content of the plan was, on the one hand, defined by what was technically possible and, on the other hand, what was politically desirable. The technopolitical perspective pushes me to ask with what approaches the different actors took part in the mutual negotiations. Before the plan was prepared, military experts had evaluated which parts of the Danish telecom infrastructure that were particularly vulnerable. This was based

---

[81] Hecht and Edwards, "The Technopolitics of the Cold War", p. 274. Originally, it was Gabrielle Hecht who in 1998 introduced the notion of technopolitics as an analytical tool, see Hecht, *The Radiance of France*, p. 15. Hecht has used the concept of technopolitics to link together processes of nuclear technology development with national identity discourses, while Edwards has linked together advances in computer technologies with Cold War agendas. See: Edwards, *A Vast Machine*, p. 215, or for more general perspectives, see Edwards, *The Closed World*.

[82] In continuation hereof, Hecht and Edwards also stress that the focus on mutual orientation is a way to avoid technological determinism. See: Hecht and Edwards, "The Technopolitics of the Cold War", p. 274; Hecht, *The Radiance of France*, p. 15. For further reflections on how to avoid determinism, see Högselius et al., *Europe's Infrastructure Transition*, p. 9; Weinberger, "The Neutrality Flagpole", p. 299.

on threat scenarios and defence strategies negotiated in NATO and in Denmark. But the final plan also harmonised with developments and extensions of networks already planned to be carried out by the telephone administrations. The plan therefore served more purposes: By means of technology, political goals were pursued and by taking advantage of a political agenda, technological objectives were achieved.

The notion of a mutual orientation means that the role and agenda of actors – whether individuals, governments, or institutions – come to the foreground. To borrow a concept from the American historian of technology Thomas P. Hughes and his work on 'large technical systems', such actors can be regarded as 'system-builders'.[83] Hughes understands technology not as individual devices but as systems linking both technical and social elements. Building on this, I view the telecommunications infrastructure that I study as a sociotechnical system not only including technical artefacts like teletype printers, cables, or satellites, but also economic, legislative, and organisational aspects and a large number of institutional and individual actors such as national tele administrations, technicians, governmental representatives, and military commanders. The 'system-builders' are the motive forces in such systems, they push for the construction and development of the sociotechnical system by using the power they possess by controlling knowledge, artefacts, or practices.[84] From this perspective, technological security systems like the 60 million kroner plan did not emerge as a result of geopolitical forces nor of technological developments in themselves, but from concrete preferences and choices of its makers.

This leads me to another analytical point, namely the transnational and international framework. International, in this sense, means between or among nations; in a basic sense, NATO is an international organisation as it involves more nations. Transnational, basically, is what crosses national borders. The two terms coalesce, and in the area of communications, historically as well as

---

[83] See Hughes, "The Evolution of Large Technical Systems", p. 25-26; Hughes, *Networks of Power*. Hughes has inspired many scholars to analyse the dynamics in developments of large-scale technological systems by bringing in social and organisational components. See van der Vleuten, "Understanding Network Societies". The LTS approach, however, has also be criticised for understanding infrastructures as centrally governed and top-down controlled thereby ignoring the inverse perspective. See Egyedi et al., "Centralization and Decentralization". Hughes has developed an advanced theoretical apparatus as part of the LTS approach, which I shall not go further into in this dissertation. For my purpose, the notion of the system-builder is sufficient.

[84] Hecht and Edwards, "The Technopolitics of the Cold War", p. 274.
While 'system-builders' in Hughes' early terminology are individuals, later research has broadened the concept and studied the role of for instance international organisations or governments as system-builders, van der Vleuten, "Understanding Network Societies", p. 304f.; Laborie, "A Missing Link?", p. 194f.; van der Vleuten et al., "Europe's System Builders", p. 326.

today, communications crossing national borders are usually referred to as international communications. I shall not go further into this 'quibbling', and through the dissertation, I shall only highlight the difference when I find it necessary. Analytically, however, I do find that there can be different insights to gain when applying the two terms in a historical examination. When studying the background of the 60 million kroner plan in an international context, it appears that the occasion for the plan was that NATO's agencies on civil emergency planning had issued a number of demands for the member states to carry out, among them initiatives to avoid a total breakdown of communications in case a larger city would be destroyed as a result of enemy action. As such, the Danish participation in an international defence alliance is an important context for understanding the 60 million kroner plan. But in the practical negotiations on the plan, the NATO context also found expression in transnational influences.

In historical research, transnational history refers to the study of cross-border flows. A transnational 'turn' in research has occurred during the last three decades, and many debates among historians on how to define and perform transnationalism have played out.[85] For my purpose, I use transnationalism as a lens and rely on a broad definition of transnational history, namely one that focuses on flows and circulations across borders.[86] The object of my interest, telecommunications, is border-crossing in itself in a material sense, but transnationalism is not only a matter of the empirical object. Instead, the transnational angle "cares for movements and forces that cut across national boundaries", to borrow a definition from Pierre-Yves Saunier.[87] In my case, this means that a transnational lens directs me to look for transnational movements and flows of for instance expert knowledge, technologies, capital, and perceptions of risks and vulnerability. By example, the drawing of the effects of an atomic bomb with which I opened this chapter was made by a military officer that represented Denmark in a NATO agency on communications. This officer was hence part of a transnational network, since he regularly met with officers from other countries possessing similar expert knowledge as he did himself. His knowledge about the effect of a nuclear bomb

---

[85] A central contribution to the field of transnational history is Iriye and Saunier eds., *The Palgrave Dictionary of Transnational History*. For research discussions, see Saunier, "Transnational", Clavin, "Defining Transnationalism", Sørensen, "Den transnationale vending?", and for a discussion on transnational history of technology, see Vleuten, "Toward a Transnational History of Technology".

[86] See for instance Vleuten, "Toward a Transnational History of Technology", p. 978. In line with other researchers, I find that the transnational perspective must be defined in respect to the concrete object of research. Clavin, for instance, stresses that transnationalism's value lies in its openness as a historical concept: Clavin, "Defining Transnationalism", p. 434, 438. See also Fossat et al., "Transnational historie", p. 10.

[87] Saunier, "Going transnational?", p. 119.

is very likely a result of his transnational connections which were then brought into play in national negotiations.

Finally, I shall make a comment on a central concept already briefly presented in this chapter, namely that of 'security governance'. Studying governance means studying a political process broader than that of decisions taken by governments or other higher authorities.[88] Governance can be defined as "interaction and decision-making among the actors involved in a collective problem", and in my case that problem was telecommunications security.[89] The 60 million kroner plan, for instance, was approved by a governmental decision, but in the entire governance process different stakeholders engaged in both the making and implementation of the plan. I understand the plan as an element in the overall security governance of the area of telecommunications during the Cold War. I draw on an understanding of security politics as "decisions and actions deemed imperative to protect domestic core values from external threats."[90] If security is basically understood as the absence of threat, this approach highlights how security policy is subjective in the way that it is based on *perceptions* of threat – what is 'deemed imperative', in other words, is a matter of negotiation.[91] When studying processes of security governance, I therefore pay attention to how different actors in this interplay for example took notions of security and insecurity in use and problematised existing telecommunications infrastructures and called for actions to be taken. However, as my examinations will show, threat perceptions were only one of many factors in the security governance of telecommunications.[92]

---

[88] The concept is related to a development in political science from a focus on 'government' to a broader focus on 'governance', which also studies political processes in areas further ways from a central political authority. For more, see Krahmann, "Conceptualizing Security Governance", p. 11. In European integration studies, for instance, the governance turn has shifted scholarly attention from treaty-making to the study of day-to-day policies. See Schipper and Schot, "Infrastructural Europeanism"

[89] Hufty, "Investigating Policy Processes", p. 405.

[90] This is a definition of national security policy presented by Melvyn P. Leffler, who in 1990 argued that the national security approach was a suitable framework for historians, since it invited for analysing both foreign and domestic factors as shaping policy – in contrast to realist studies focusing on power and idealist studies focusing on peace. See Leffler, "National Security", p. 143. Today, scholarly approaches to security policy are typically more global. Yet, as the editors of *The Handbook of Global Security Policy* point out, security policy is, on a basic level, "supposed to address insecurity", and when studying the Cold War years, this task was first and foremost carried out by nation states and political blocs. See: Kaldor and Rangelov, "Introduction: Global Security Policy in the Twenty-First Century", p. 1.

[91] Pedersen, "Sikkerhedsbegrebet", p. 47: Villaume, *Allieret med Forbehold*, p. 23.

[92] For this reason, with the aim of reaching a broad understanding of security governance, I do not draw on constructivist approaches to security. In the field of critical security studies, for instance, scholars identify and analyse 'problematizations' of security, i.e. ways in which things come to be treated as security problems. For more, see Aradau et al., "Introducing Critical Security Methods", p. 1ff. For a constructivist approach to

Much of the security politics studied in this dissertation is related to preparedness planning. 'Preparedness' is not a well-defined concept and several terms are in play when studying preparedness in historical contexts. In Denmark, the term 'beredskab', which roughly translates as preparedness, was used. In NATO, the preparedness initiatives in the civilian area were labelled as 'civil emergency planning', and the same term was used in Danish documents when translated into English. Elsewhere, the term 'contingency planning' was used, and all of these terms are related to the idea of 'total defence', although it differs from country to country what the total defence covers. When using the term of preparedness in my examinations, I refer to the phenomenon of preparing all parts of a society for war and crisis, including both the practical planning and the underlying idea.

1.4 Source material

The analytical framework presented above has informed my search for relevant source material and my examinations of the material. My analytical focus on technopolitics and security governance involves examinations of both actors, policies, practices, and material aspects of Cold War telecommunications security, which necessitates inquiries into an extensive collection of source material of different origin. Before providing a brief presentation of the material, I shall shortly explain two overall concerns that have been decisive in my analytical process.

First, my search for empirical material has gone hand in hand with my efforts to map out the development of telecommunications security governance in the examined period. As such, the primary task has been to create an overview of the governmental authorities, institutions, agencies, or working groups that were responsible for different aspects of telecommunications emergency planning at different times. This applies both in the case of NATO and the national Danish context. Throughout the period, responsibilities and concrete tasks were transferred from one authority to another on several occasions for which reason different agencies were established, relocated, restructured, and closed down. It follows from my analytical framework that these different stakeholders and the interplay between them is important. It is my belief that these organisational aspects are in themselves a key to understanding the governance of telecommunications security and it is therefore an aspect that I pay particular attention to.

Second, the technopolitics perspective means that many of my efforts have gone into scrutinising the course of events in different case studies. In

---

critical infrastructures, see Hommels et al., "Europe's Infrastructure Vulnerabilities", p. 263.

doing so, I take account of the backgrounds leading to different decisions related to telecommunications security such as the adoption of the 60 million kroner plan. In reconstructing these developments, the different disputes or tensions that have played out between the involved actors come to the foreground. This means that much of the material that has caught my attention is related to different conflicts. This reflects the fact that telecommunication security matters were complex and involved many stakeholders, but it also appears to be a general tendency in historical records that negotiations involving conflicting interests have produced more material, for instance by triggering correspondence back and forth.[93]

The source material used in this dissertation can be divided into two categories: NATO material and Danish material. The records produced by NATO are located in the NATO Archives (including its online collections) and, as for the material forwarded to national governments or agencies, in national archives in the member states.[94] The archive material from NATO reflects the structure of the alliance agreed upon shortly after the signing of the Atlantic Treaty in 1949 as composed of a political-civilian and a military string. The North Atlantic Council (NAC) is the supreme political decision-making body and meets either in ministerial sessions gathering the member states' ministers for foreign or defence affairs or more frequently in sessions gathering the permanent council deputies from each country. The Military Committee (MC), consisting of national Chiefs of Staff, is the highest military authority in NATO and responsible for defence planning. Moreover, to facilitate the work of the MC, a Standing Group (SG) was established as an executive military body with representatives from the United States, France, and the United Kingdom.[95]

The majority of the NATO material relevant for this dissertation stems from the North Atlantic Council or one of the many permanent or temporary committees or working groups, some of which existed for a very short time, set up with reference to the Council and composed by members of the national delegations. Memoranda from Council meetings and reports or working papers attached in annex to these have composed an important source material. A smaller amount of material stems from the military string, primarily the Standing Group.

---

[93] For methodological considerations on this kind of material, see also Trischler and Weinberger, "Engineering Europe", p. 71.

[94] NATO Archives Online (http://archives.nato.int/) has made available documents from primarily the first 10 years of the alliance's existence, but extends its database on an ongoing basis.

[95] The SG was responsible for the daily business of the MC, which did not meet regularly. "NATO Handbook", January 1952, p. 18f. NA.

However, there is a disproportion as regards time in the available material. Although some NATO records up to the early 1980s have been released, the vast majority hereof stems from the first decades of the alliance's existence.[96] Furthermore, the disclosure process has generally prioritised the more common aspects of allied cooperation and not the most specialised agencies.[97] In more cases, I have therefore located NATO material in Danish Archives that I have not come across in the NATO Archives. Moreover, the content of the NATO documents also poses challenges. First of all, the written language used has a quite administrative and consensual character focusing on the final decisions for which reason backgrounds, motivations, or disputes rarely find expression. Furthermore, in material from the technical and highly specialised working groups, one rarely finds expressions of the political or strategic context. The records do offer a clear picture of internal discussions and decisions, but they must be contextualised in order to identify the underlying factors of decisions and developments in NATO. An important group of documents are the yearly reviews of progress that were carried out in a number of the specialised agencies. However, these reviews are not always continuous – instead, in more cases it appears random when such reviews were carried out and when not. Furthermore, the reviews raise the question of comparability, since the information from national governments that the reviews build upon varies greatly in character due to structural differences. Therefore, as I will comment on when it comes up, there are methodological challenges associated with bringing in the member state level in the NATO material.

The Danish material used for this study is located at the Danish National Archives (Rigsarkivet) and in the collections of the Danish Museum of Communication, ENIGMA. The Danish material can be divided into three categories: Material stemming from an agency abbreviated NALLA, material related to political processes, and material from the telecom sector.

The National Long Lines Agency Denmark (NALLA Denmark) was first placed under the Ministry of Defence and later transferred to the Postal and Telegraph Services (P&T) and the National Telecom Agency [Telestyrelsen], later the National IT and Telecom Agency [IT- og Telestyrelsen]. NALLA was closed down in 2008, whereupon its field of responsibility and archives were transferred to the Danish Defence Intelligence

[96] The policy on public disclosure in NATO is a 30 year rule. However, the disclosure of NATO material is a complex matter involving the approval of all national delegations for which reason the disclosure proceeds slowly. See more at https://www.nato.int/cps/en/natohq/topics_120438.htm (Accessed March 16, 2018).

[97] I have for example not been able to find the collection of records from the European Long Lines Agency (ELLA) established in 1951 with reference to the Standing Group.

Services [Forsvarets Efterretningstjeneste].[98] NALLA's records up until the late 1990s were handed over to the Danish National Archives by the time this research project began. NALLA was the responsible agency as regards telecommunications security and preparedness planning in the period under study and its records have therefore been crucial for my examinations. These records are characterised by being 'expert material' related to operational concerns, registration of circuits, and exercise planning. The NALLA records contain material from the period from 1950 to 2000, including classified documents that I have been permitted access to on the condition that the Danish Defence Intelligence Services read my manuscript before publication. This has been a long-standing process but has not necessitated major changes in my writings. However, I have not been able to refer directly to all the documents that I have examined. Still, my studies hereof serve as background for my understanding of the development that I examine in the dissertation.

Moreover, back in 2013 when I first embarked on this project, I carried out five interviews with informants who have been involved in NALLA's activities during the Cold War.[99] The interviews gave me background knowledge on the institutional history and the inner workings of NALLA and its collaboration with the telecom sector, which has helped me navigate in the archive material.

In order to shed light on the political dimension, I have identified relevant archival material from a number of Danish ministries: From the Ministry of Defence material illuminating the defence political aspects; from the Ministry of Foreign Affairs material illuminating foreign policy aspects; and from the Ministry of the Interior material related to civil preparedness planning.[100] Moreover, the Ministry of Public Works (from 1987 integrated into the Ministry of Traffic) is central for my examination, as this was the ministry responsible for telecommunications. Since the task of telecommunication preparedness fell in between different ministries, the intra-ministerial communication taking place between the ministries has been an important

[98] The Center for Cyber Security is now responsibile for coordinating preparedness planning in the area of telecommunications. See more: https://fe-ddis.dk/cfcs/opgaver/Telemyndighed/Pages/Telemyndighed.aspx (Accessed March 16, 2018).

[99] The interviews are now filed in the Enigma Archives.

[100] This ministry hosted the Secretariat for Civil Emergency Planning [Sekretariatet for Civilt Beredskab], the records of which requires a special mentioning here. They contain a number of reports written in 2004-2005 by Per Heikel Vinther, who was a central figure in civil preparedness planning for many years, as well as a selection of the records on which the reports are based. One of the reports, entitled "Teleberedskabet og Databeredskabet", is an eleven pages overview of the emergency planning in the area of communications. Vinther's summary however appears to be quite biased, and it has mainly served as an introduction for me, whereupon I have made further examinations in the available source material.

group of sources. Furthermore, I have consulted published material such as the official Report of Danish Parliamentary Proceedings (until 1953 Rigsdagstidende, thereafter Folketingstidende) and newspapers and journals.

The Danish telecom sector consisted of the four 'tele administrations', the Postal and Telegraph Services (P&T), which was a department under the Ministry of Public Works, and three regional telephone companies, Kjøbenhavns Telefon A/S (KTAS), Jydsk Telefon A/S (JTAS), and Fyns kommunale Telefonselskab (FkT). I shall elaborate on this structure in chapter three. Besides the archives of the Ministry of Public Works, including a supervisory organ, the Telephone Control Board, and the P&T, I use material from the company archives of KTAS and JTAS, whereas I have not examined the archives of the FkT, which was a considerably smaller enterprise. A large amount of the company records is located in the Danish National Archives, but central parts of the records are filed in the archives of Enigma. The Enigma Archives moreover contains a collection of material related to telecommunications preparedness planning, which is primarily based on personal archives from actors who have been involved in the field.

In addition to the above-mentioned NATO and Danish collections, I have found relevant material in the British National Archives, the online collections of the International Telecommunication Union, and the official documentary record of US foreign policy, the Foreign Relations of the United States (FRUS).

Lastly, it should be noted that when Danish sources are paraphrased or quoted, I have done the translation from Danish to English myself. In the case of notable wordings or the like, I have added the original formulation in square brackets. I have chosen to translate the most commonly used Danish names such as the Post and Telegraph Services to English. As a help to the reader, I have included a list of the many organisations, agencies, committees etc. mentioned in this dissertation in Annex A.

1.5 Structure of the dissertation

The dissertation is structured around five analytical chapters, each addressing a particular aspect of the overall topic. My narrative shifts between an international and a national point of departure. Two chapters (2 and 4) focus primarily on NATO, while four chapters (3, 5, and 6) focus primarily on the Danish context, although paying attention to the transnational interplay. I have chosen this structure in order to demonstrate the complex interplay between international and national settings. The first two chapters take their point of departure in the late 1940s and concentrate on developments in the early 1950s, while the following chapters concentrate on later developments.

However, the chapters overlap chronologically since I have prioritised a thematic focus.

In chapter two, *Networked allies*, I examine the role ascribed to and played by telecommunications in NATO's quest for Western European security in the early Cold War years. The chapter shows how networking initiatives were a key component in the build-up of a common defence of Western Europe, which materialised in the construction of transnational communications systems relying on the use of national civilian infrastructures. By linking together these developments with general political developments in the area of communications in these years, I argue that NATO must be regarded as an important forum for telecommunications 'system-building' in post-war Western Europe. The consequence of this was that alliance issues increasingly entered into communication spheres. This aspect will be explored from a national point of view in chapter three, *Making the home front*, in which I examine how the Danish telecom sector 'adapted' to the Cold War. The chapter follows the consequences of the transnational telecommunications system-building in the early Cold War years in the Danish context, examining how Danish ministries, the Danish Defence, and the telecommunications sector engaged with new challenges brought along by the NATO membership and the new geopolitical circumstances. I argue that these developments became decisive for Danish telecommunications in the 1950s, since the increased need for military communications had to be balanced with other ambitions in the sector.

In chapter four, *Networked and nuclear allies*, I shift the focus back to NATO beginning with the 1954 adoption of a new nuclear strategy. I examine how this affected the alliance's conduct in the area of communications for the rest of the Cold War period, demonstrating how different technopolitical visions lay behind different phases of system-building. The last two analytical chapters follow up on the nuclear preparedness agenda in a Danish context. In chapter five, *If war comes*, I focus on the concrete task of securing the Danish communications infrastructure by looking into different cases of actions and measures taken to protect the physical infrastructure against nuclear attacks and ensure that networks would be functional in wartime. The chapter demonstrates how the responsibility of telecommunications preparedness increasingly came to rest with technical experts rather than with defence authorities due to political and technological developments. Chapter six, *Public-private balances in communications security*, delves into another related problem of telecommunications security governance, namely that of the public-private division of responsibility. The chapter examines how the arrangement for telecommunications security governance in Denmark was challenged by the particular hybrid structure of both public and private management in the sector. Moreover, as a short epilogue, I discuss how the move towards liberalisation of

the area of telecommunications in the period around the end of the Cold War challenged existing practices of security governance.

Finally, in the conclusion, I gather up the threads and discuss what my study of Cold War telecommunications security governance in NATO and Denmark provides to current understandings of communications and preparedness in the Cold War.

[2]

Networked allies

Telecommunications and the defence build-up in post-war Western Europe

In the aftermath of the Second World War, the post-war struggle to shape the political landscape of Europe began. One of the many pieces in the puzzle was Europe's national and transnational telecommunications infrastructure. These networks were generally in a poor condition, either because they had been directly affected by war damages or due to poor maintenance and lack of investment. Moreover, the political situation in Europe and the emerging Cold War tensions soon echoed in the area of telecommunications. By way of example, the Iron Curtain also appeared in the shape of communication networks: In the East, communication links were restored, but routed through Moscow, whereas in the West, national PTT networks were soon brought back to operation with aid provided via the Marshall Plan, and through the 1950s, the inner-Western connectivity, including transatlantic links, improved markedly.[101] This process of reshaping Western Europe's telecommunications did not only take place in civilian areas. In the context of first the Western Union Defence Organisation (WUDO) and then the North Atlantic Treaty Organisation (NATO), existing national networks in Western Europe were connected, new common infrastructure was established, and a system including both military and civilian circuits evolved.

In this chapter, I examine the technopolitical agendas that lay behind these military-political attempts to network Western Europe in the early post-war years. Thus far, in research on the post-war reshaping of Western Europe's telecommunications, military developments have generally been overlooked. Instead, focus has been on how existing forums for international cooperation on communications such as the International Telecommunication Union (ITU) were challenged by Cold War tensions, and on several attempts at regional integration in Western Europe – of which many failed to materialise.[102] In NATO, joint investments in communications infrastructure were made as part of the so-called 'common infrastructure programme', which also

[101] Huurdeman, *The Worldwide History of Telecommunications*, p. 363; Högselius et al., *Europe's Infrastructure Transition*, p. 51f.
[102] See for instance Hills, *Telecommunications and Empire*; Laborie, "A Missing Link?", Laborie, "Fragile links, frozen identities", Henrich-Franke, "Comparing Cultures of Expert Regulation", Laborie, "Enveloping Europe".

concerned investments in for instance the construction of airfields. While a few historical studies have explored some of the burden-sharing discussions that this programme caused among the allies, the majority of the literature on the programme stems from the organisation itself and focuses on internal alliance issues without paying attention to contemporary infrastructural developments in Western Europe. In these publications, the infrastructural cooperation is praised as an important "cornerstone of Alliance activity" and "a unique example of member nation solidarity".[103]

This chapter offers a different perspective. It starts from the assumption that an examination of the telecommunications system-building related to defence cooperation in Western Europe can contribute to an understanding of how the area of telecommunications was subject to Cold War technopolitics and security governance. The chapter makes a twofold argument, namely that telecommunications infrastructures played a crucial role in the military integration and quest for security in Western Europe, and, in continuation hereof, that NATO thereby emerged as an important forum for telecommunications 'system-building' in Western Europe, a forum also engaging actors in national public administrations and the telecom sectors. Thus, since the military communication system-building expanded well beyond defence purposes, it came to serve as a catalyst for developments in telecommunications networking in general.

In order to do so, I explore the networking initiatives that arose from defence cooperation from both an external and internal perspective, taking both the general political development in the area of communications and the internal NATO developments into consideration. Hence, the chapter proceeds as follows. First, I look into the governance of transnational telecommunications in the early Cold War years, examining how new

---

[103] Foreword by Secretary General Lord Robertson in NATO, *50 Years of Infrastructure*, p. 5. The infrastructure programmes are also commemorated by NATO's first Secretary General Lord Ismay in his 1954 memoirs, see Ismay, *NATO. The First Five years*, pp. 114-124. Also, in 1956 the former chairman of the NATO Infrastructure Payments and Progress Committee, G.O.J. van Tets wrote a small piece about the birth of the programme: van Tets, "The Birth and Significance of Common Infrastructure". A section on the infrastructure programme – based on the writings of Ismay and van Tets, NATO press releases, and interviews – is also included in a 1967 study of NATO's international administration: Jordan, *The NATO International Staff/Secretariat 1952-1957*, pp. 265ff. As for historical research on the topic, Wallace J. Thies has touched upon the infrastructure programme in his analysis of burden-sharing and burden-shifting in NATO. Thies shows how member states, attempting to "cut corners whenever possible", prioritised those installations that qualified for common infrastructure funding such as large air bases over other types of investments needed for military effectiveness, for instance aircrafts and support equipment. See Thies, *Friendly Rivals*, pp. 11-12. In the Danish context, Poul Villaume has examined the controversies around establishing airfields in Denmark through NATO's common infrastructure programme. See Villaume, *Allieret med Forbehold*, see pp. 248, 406-416, 572.

geopolitical agendas affected international cooperation in the area. This is a necessary context for understanding the significance of NATO's collaboration on telecommunications infrastructure. This section builds primarily on existing research. Second, I turn the focus towards NATO's telecommunications infrastructure with the purpose of examining – through the lens of technopolitics – the background, visions, and motive forces with which this infrastructure was established. This chapter only concentrates on the very first years of infrastructural integration in NATO, whereas the following phases of networking the alliance will be further explored in chapter four.

2.1 International governance of telecommunications in the early Cold War

By the mid-twentieth century, national telecommunications in Western Europe were typically governed by a public postal, telegraphy, and telephony (PTT) administration.[104] As for transnational communications, governments negotiated specific issues bilaterally and international matters in international fora. In this section, I explore how the landscape of international telecommunication governance changed notably in the post-war years. On the one hand, the cooperation in ITU became, as described by the French historian of communications Léonard Laborie, "more permeable to world politics".[105] On the other hand, new regional initiatives for communications collaboration emerged in Europe.

In the new geopolitical situation that emerged after the Second World War, ITU was restructured and turned into a specialised agency under the United Nations (UN) in 1947. The idea of integrating ITU into the UN structure grew out of the Second World War, during which the United States and Britain had begun discussing the post-war prospects for the international communications organisation.[106] Léonard Laborie has demonstrated how the

---

[104] Research on communications history has called attention to how the very technology of telecommunications that developed through the nineteenth century had 'natural monopoly' characteristics. This is explained with the fact that although many telegraph and telephone networks in Europe were established in private – and for telephone networks very local – settings from the outset, long-distance telephone and telegraph networks were nationalised by the 1910s. See: Michalis, *Governing European Communications*, p. 32; Millward, "Business and the State", p. 546; Millward, "European governments and the infrastructure industries", p. 5; Reynolds, "Science, technology, and the Cold War", p. 390.

[105] Laborie, "Fragile links, frozen identities", p. 318.

[106] The US-British discussions were likely a response to Nazi Germany's 1942 establishment of a European Postal and Telecommunication Union (EPTU) in Vienna, which included Germany, Italy, and eleven other satellite or occupied countries, e.g. Denmark. Hills, *Telecommunications and Empire*, p. 46f. For more om EPTU and its pre- and post-war continuities, see Laborie, "Enveloping Europe".

reshaping of ITU from 1944 to 1947 was a process in which the US and the USSR acted hand in hand, since both superpowers opted to integrate the ITU into the UN and thereby into the new world political order. By contrast, Britain and France favoured the ITU to have weaker links with the UN, thereby hoping to preserve ITU's autonomy and its governance system which had historically been dominated by the old European powers, not least Britain.[107] The future of the ITU was settled at a series of three global telecommunication conferences from May to October 1947 hosted by the United States in Atlantic City, New Jersey. One of the outcomes of the Atlantic City conferences was that the ITU was re-established as a specialised agency placed under the United Nations in accordance with Article 57 of the UN Charter. In this way, ITU was affiliated with, but not fully integrated into, the UN.[108]

The idea of reorganising ITU was not welcomed in the circles of technical experts. Scholars have used the term of "technocratic internationalism" to describe the atmosphere within ITU since its establishment in the nineteenth century, noting how the structure of the union generally separated politics and expert governance and how the community of technical delegates meeting in ITU sought to minimise the role of international politics in the management of telecommunications. In the interwar years, the ITU had denied proposals to integrate the union into the League of Nations structure and had continued cooperating with Nazi Germany on international telecommunications management.[109] In the post-war environment, however,

---

[107] Laborie, "Fragile links, frozen identities", p. 314f. The future of the ITU was discussed at the 1946 Moscow Telecommunications Conference among the five powers dominating post-war world politics, the United States, the Soviet Union, Britain, France, and China. See: Documents of the Moscow Telecommunications Conference, volume I. ITU-H.

[108] The US hosting of the conference came into being after immense diplomatic efforts, as more European states favoured holding the ITU conference in Europe. This created what the Danish Foreign Ministry referred to as a "difficult situation". See: Letter from UM to Danish embassies in Washington, London and Brussels, May 17 1947. UM 92.B32a, I. RA. On British attempts to bring the ITU conference to Europe, see also Hills, *Telecommunications and Empire*, p. 48f. In general, the conferences appear to have been ascribed major political importance, and national technical delegations were given very specific orders by their foreign ministries on how to navigate in different matters. On the instruction of national delegations, see Laborie, "Fragile links, frozen identities", p. 317. Besides that of the future affiliation of the ITU, a main issue discussed at the Atlantic City Conferences was the allocation of radio frequencies. On the basis of a US proposal, the delegates agreed to establish International Frequency Registration Board (IFRB).

[109] Henrich-Franke, "Comparing Cultures of Expert Regulation", p. 286; Laborie, "Fragile links, frozen identities", p. 312f. For more on the concept of technocratic internationalism, referring to a widespread mix of pragmatism, a-politicism, and faith in experts, see Kaiser and Schot, *Writing the Rules for Europe*, p. 6f.; Schot and Lagendijk, "Technocratic Internationalism in the Interwar Years", p. 198. The League of Nations did set up a Committee for Communications and Transit (CCT), but this committee focused mainly of cross-border transport issues.

these technical expert concerns were trumped by foreign policy considerations. This can be illustrated with an empirical example from the records of the Danish Foreign Ministry. When the future of ITU was discussed in the summer of 1946, the Danish Postal and Telegraph Services (the P&T) argued in a note to the Danish Foreign Ministry for "retaining the purely technical, unpolitical line" within ITU. The P&T stressed how the current organisation of the ITU has, after all, proven to survive two world wars. The P&T feared how an ITU under the influence of the United Nations would fare in case of a new large-scale superpower conflict and underlined that "it can never be fortunate to let political factors be a part of a purely practical, technical cooperation".[110] The Danish Foreign Ministry however placed foreign policy concerns over the concerns expressed by the P&T, and along with many other states, Denmark supported the American proposal of integrating ITU into the UN.

The reorganisation of ITU took place in the context of what John Lewis Gaddis has referred to as "the most remarkable *polarization* of politics in modern history."[111] The attachment to the United Nations meant that UN member states were now also automatically members of the ITU. As a result, the number of ITU members increased considerably and the Eurocentrism that had previously characterised the organisation came to an end.[112] While the Soviet Union and the satellite states left most other specialised UN agencies, they remained members of ITU and thereby the East and West kept cooperating on telecommunications. In practice, however, this meant that ITU was also polarised. With the words of Laborie, ITU became "both a mirror of world political struggle and a distinctive site for shaping conceptions of the international order", and Laborie and other scholars have observed how even the technical cooperation within ITU was highly politicised in these years and deeply affected by cold War politics.[113] By example, a French technical expert

---

[110] Minutes, July 30 1946, UM 92.B32a, I. RA; Note on the relations of the telecommunications union to the UN, August 12 1946, UM 92.B32a, I. RA. Prior to this, the Danish Foreign Ministry had received a letter from the UN Economic and Social Council expressing hopes for a world conference on telecommunications to be convened as soon as possible to review ITU organisation and radio regulations and enable ITU relationships with the UN.

[111] Gaddis, *We Now Know*, p. 26. [Italics in original].

[112] Laborie, "Fragile links, frozen identities", p. 317; Henrich-Franke, "Comparing Cultures of Expert Regulation", p. 290. Since participating countries in ITU did not need to be UN members, and thereby a recognised sovereign state, the system where European imperial states had formerly represented colonial territories ended.

[113] Laborie, "Fragile links, frozen identities", p. 313 See also Laborie, "A Missing Link?", p. 188. This tendency was observed by the ITU specialist George A. Codding in a 1952 publication: Codding, *The International Telecommunication Union*. For the politicisation of the ITU cooperation, see also Slotten, "The International Telecommunications Union, Space Radio Communications, and U.S. Cold War Diplomacy", pp. 318, 324.; Beyersdorf, "Freedom of Communication". However, it has

noted that the Eastern bloc in ITU appeared as "Thirteen echoes from the East".[114] The Soviet Union increasingly viewed the ITU as an institution largely serving the interest of the United States and its allies and began actively to obstruct US efforts.[115]

The ITU development is necessary to have in mind when studying the NATO allies' cooperation on telecommunications. The emergence of an Eastern and Western bloc in the ITU meant that the NATO allies – which had previously been opposed in international telecom matters – now to a larger extent appeared as a united front in the ITU. For the United States, the ITU became an increasingly important forum through which NATO allies could be activated to support specific technopolitical agendas. This can be illustrated with another example from the records of the Danish Foreign Ministry. The example concerns the establishment of the long-range radio navigation system known as LORAN. The system, developed at the Massachusetts Institute of Technology (MIT) during the Second World War, enabled ships, submarines, or aircrafts to determine their position by measuring the time difference between the arrivals of radio signals from a number of widely spaced radio transmitters.[116] The system became increasingly important for US operations in the North Atlantic, and in February 1949, a conference was held in Geneva at the initiative of the United States with the purpose of authorising the continuation of LORAN operations in the Northern Atlantic. A resolution was passed at the conference, but only with a very small majority. By the summer of 1949, the United States was of the impression that attempts would be made to turn down the resolution at an upcoming ITU conference. If it came to a voting, the US feared that the Soviet controlled bloc, if this included Finland, would be able to obtain eleven votes, whereas only nine would vote for the continuation of LORAN operations. The United States therefore began putting major pressure on their new allies Norway and Denmark, who had both abstained from voting when the first resolution had been passed. In June, the director general of the Danish P&T, KJ Jensen, was directly ordered by the Danish Foreign Ministry not to vote for a discontinuation of the LORAN service. The permanent undersecretary in the ministry admitted that it was "deplorable" ["beklageligt"] that foreign political matters now intermingled in

---

also been argued that the politicisation of international telecommunications cooperation arrived earlier, see for instance Jeding, "National politics and international agreements", p. 31ff; Lundin, "De Små Stegen", p. 174.

[114] Pierre Schaeffer quoted in Laborie, "Fragile links, frozen identities", p. 320. The situation described by Schaeffer played out at a special radio conference held in Mexico City between October 1948 and April 1949.

[115] Ibid.; Slotten, "The International Telecommunications Union, Space Radio Communications, and U.S. Cold War Diplomacy", p. 325.

[116] Högselius et al., *Europe's Infrastructure Transition*, p. 215; Mackenzie, *Inventing Accuracy*, p. 143f.

such matters that had previously been managed "on the basis of purely technical and factual viewpoints".[117] This was nonetheless the circumstance. The decision to allow LORAN operations in the North Atlantic proved to be essential for the NATO allies in the decade that followed.[118]

When turning the attention towards the governance of border-crossing communications in Western Europe, the tendency in the early Cold War years seems to be one of increased regional cooperation on telecom matters – either on practical matters furthered by technical experts or in response to political pushes for European integration. In the interwar years, new expert forums for telecom cooperation in Europe had emerged in the shape of the Consultative Committees for Telegraphy, Telephony, and Radio (the CCIT, CCIF, and CCIR). These committees brought together experts from national PTTs to discuss regulation and standardisation of cross-border communications.[119] Right after the Second World War, in 1946, the work within CCIF was resumed. Here, in contrast to earlier achievements which had focused on rules and regulations, the technical experts in CCIF revisited plans that had been drawn up in the 1930s for a European system of trunk lines and translated these into a five-year development plan for the extension of the European network. In reply to the world war, thus, the perception in these technical expert circles was that the post-war situation in Western Europe necessitated infrastructural integration.[120]

CCIF, however, was a technical consultative forum and not a political decision-making forum. Through the 1950s, several attempts were made in Western Europe to establish closer political cooperation on postal and telecommunication matters, both in the context of the Council of Europe, established in 1949 to work for greater European unity, and within the confines of the European Coal and Steel Community (ECSC) established in 1951. Proposals were made for both a reinforcement of the technical cooperation, for financial cooperation on lowering the rates of cross-border communications, and for supranational integration of telecommunication

---

[117] Letter from UM to the General Directorate of the P&T, June 21 1949. UM 92.B.39 1948-49. RA.

[118] For more, see Högselius et al., *Europe's Infrastructure Transition*, p. 215f; Villaume, *Allieret med Forbehold*, p. 617f.

[119] Henrich-Franke, "Comparing Cultures of Expert Regulation", pp. 282-284.

[120] Laborie, "A Missing Link?" , p. 196f. These plans for extending the European network bypassed Germany. A contemporary article from a Danish technical journal outlines how the plan was to make a 'cable ring' around Germany from the Netherlands via Denmark, Sweden, and Bornholm to Poland. However, the Polish stretch was put on hold, for which reason the cable network plans first the shape of a horseshoe instead. Holmblad, "Koaksialkabelanlægget Danmark-Holland", p. 3. In 1960, however, a submarine cable was established between Bornholm and Bielice in Poland. Nielsen, "Kabler og forstærkerstationer", p. 288.

infrastructures.[121] These ambitions reflected a general political push in favour of closer cooperation and integration between European nations in these years. In response, many other transnational forums for infrastructure collaboration emerged, for instance the European Conference of Transport Ministers in 1953, and the European Commission of Civil Aviation in 1955.[122]

In the area of telecommunications, however, things moved more slowly. While it has previously been suggested that telecommunication was not a priority sector within the context of European integration, newer research has clarified how it was infrastructure experts and national PTTs who successfully prevented attempts at supranational integration.[123] Léonard Laborie and Christian Henrich-Franke have demonstrated how this reluctance was caused by different factors. First, given the poor condition of national telecom facilities, the implicated states prioritised reconstructing national (or imperial) networks and protecting domestic industries. The prospects for lowering rates on for example international telephone calls also caused concern, since these were a good source of income for the operators, in most cases the national PTTs. Second, in comparison to other infrastructures, e.g. transport technologies, transnational telecommunications required a lower level of interoperability and standardisation. This rendered possible a larger extent of 'protectionism' of national networks, since border-crossing communications did not require more than a gateway technology providing connection between national networks. Third, considerations were given to the fragile East-West relationship, as some PTT experts rejected the idea of further Western integration of telecommunications since this would risk paralysing the scarce cooperation with the socialist states within the ITU.[124]

These attempts in Western Europe echoed in the East, where the Soviet Union in 1957 initiated the establishment of a forum for cooperation in the field of telecommunications and postal communications among socialist states.[125] This did however not paralyse the cooperation in ITU, where the

---

[121] In this process, the German and French PTT Ministers Hans Schubert and Edouard Bonnefous played proactive roles. Supranational initiatives were suggested again with the 1957 creation of the European Economic Community (EEC) and continued to be so up until the 1980s. See: Henrich-Franke, "Comparing Cultures of Expert Regulation", p. 280f.; Laborie, "A Missing Link?"; Laborie, "Fragile links, frozen identities", p. 321; Davids, "European Co-operation in Telecommunications and the Dutch PTT", p. 360.
[122] Laborie, "A Missing Link?", p. 189f., 194.
[123] For the first perspective, see Michalis, *Governing European Communications*, p. 32. For the latter, see Henrich-Franke, "Comparing Cultures of Expert Regulation", p. 281.
[124] Laborie, "Fragile links, frozen identities", p. 322, 324; Henrich-Franke, "Comparing Cultures of Expert Regulation", pp. 281, 291f.
[125] The members of the Organisation for Cooperation of Socialist Countries in Tele- and Postal Communications (OCSC) were the postal and telecommunication administrations of the Albanian People's Republic, the Bulgarian People's Republic, Hungarian People's Republic, the Democratic Republic of Vietnam, the German Democratic Republic, the Chinese People's Republic, the Korean People's Republic, the Mongolian People's

Soviet Union in the Khrushchev era after the 1953 death of Stalin began taking on a more cooperative attitude.[126] Western European cooperation therefore became less problematic, and in 1959, twenty European countries, both NATO allies and neutral countries, created the European Conference of Post and Telecommunication Administration (CEPT) as a regional sub-organisation of the ITU.[127] However, the CEPT emerged as a purely administrative expert forum, controlled by managers of the national PTTs and not by politicians. In this way, it was the technocratic ambitions more than the political supranational ambitions put forward in for instance ECSC that were put into practice. CEPT became important for making practical improvement of technical services and for physically interconnecting national telecom systems, but did not work for the integration of international telecommunication infrastructures in Europe. Instead, the tendency towards prioritising national sovereignty and monopoly in telecommunication arenas in most European countries in these years continued. In this respect, CEPT remained a 'handmaiden' for national PTTs.[128]

2.2 Defending – by connecting – Western Europe

In continuation of the developments in international telecommunications governance in the early Cold War years, I shall suggest that NATO also appeared as an important forum for establishing border-crossing telecommunications infrastructure in Western Europe during the Cold War.

In order to understand the great awareness paid to telecommunications in NATO's early years, one must look back on the period prior to the establishment of the alliance. In 1948, five Western European nations created the Western Union Defence Organisation (WUDO) with the purpose of organising a common defence of Western Europe in case of a future war. Besides rearming forces, this cooperation involved the construction of common infrastructure installations needed for defence purposes. In 1951, WUDO's cooperation on infrastructure was adopted and further broadened

---

Republic, the Polish People's Republic, the Rumanian People's Republic, the USSR, and the Czechoslovak Republic. For more on OCSC, see Butler ed. *A Source Book on Socialist International Organizations*, p. 526f.; Szawlowski, *The System of the International Organizations of the Communist Countries*, p. 142; Laborie, "Enveloping Europe", p. 319; Henrich-Franke, "Die Gründing europäischer Infrastrukturorganisationen im Ost/West-Vergleich".

126 Laborie, "Fragile links, frozen identities", p. 324.

127 The founding members were Austria, Belgium, Denmark, Finland, France, Western Germany, Greece, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, and the UK. See: CEPT, "Background".

128 Laborie, "A Missing Link?", p. 189; Laborie, "Fragile links, frozen identities", p. 325; Henrich-Franke, "Comparing Cultures of Expert Regulation", p. 296, Laborie, "Enveloping Europe".

by NATO. Hereby, the NATO allies initiated a first phase of 'networking' the alliance, which brought along a focus on other challenges related to the infrastructural integration of the alliance, for instance how to best make use of existing communication facilities in the member states. In this section, I examine the concerns and priorities that lay behind these networking initiatives in the late 1940s and early 1950s and the concrete outcome hereof in the form of a communications system relying on both military and civilian national infrastructure. By identifying the political and technological agendas that were at stake in this area and the practice of telecommunications management that emerged hereof, I shall demonstrate how NATO came to play an important role for the connection, standardisation, and further development of military as well as civilian communications in Western Europe. In order to do so, I first look into the political and military background for organising a defence of Western Europe. Second, I examine the technopolitical interactions in the construction of a common communications system in first WUDO and then NATO. Third, I look into the organisational challenges that emerged in this networking process, in particular the problem of military-civilian coordination.

A new security arrangement for Western Europe

By the end of 1947, negotiations between the four victory powers of the Second World War – the United States, the Soviet Union, France, and Britain – to find a solution to the German problem collapsed, thereby leaving the rest of Europe in an uncertain situation. This caused Britain, France, Belgium, Luxembourg, and the Netherlands to join forces in a union, formalised with the signing of the 'The Brussels Treaty of Economic, Social and Cultural Collaboration and Collective Self-Defence' on March 17 1948.[129] Historians have emphasised how the treaty was mainly an important signal to Washington indicating that the Europeans were committed to enter into a coordinated Western defence cooperation.[130] Prior to the signing of the treaty, US Secretary of State George Marshall had informed the British and French governments

[129] "Treaty of Economic, Social and Cultural Collaboration and Collective Self-Defence", Brussels, March 17 1948. NA-E.

[130] The idea of a defensive alliance had hitherto been presented by Churchill in his famous Fulton speech in March 1946. The following year, France and Britain entered the Dunkirk Treaty, which established collaboration between the two and underlined the need for similar arrangements with the Benelux countries. As a result of the collapse of the negotiations on Germany, the Western powers were uneasy about the prospects of Soviet aggression and expansionism in Europe – a concern that some historians have however regarded as overrated. See Thies, *Friendly Rivals*, p. 25; Park, *Defending the West*, p. 5; Ismay, *NATO. The First Five years*, p. 7. As Lawrence Kaplan has underlined, the language of the Brussels Treaty was structured in a way that was appealing to the Americans, as it highlighted 'self-help' and break-down of economic barriers which were also central American requirements in the Marshall Plan. See Kaplan, *The Long Entanglement*, p. 30.

that the countries of Western Europe had to show "what that they were prepared to do for themselves and for each other before asking for further American assistance".[131]

The intention of the Brussels treaty was both to promote the economic recovery of Europe and to provide mutual security. The latter was exemplified in the treaty with a 'musketeer oath', a mutual defence clause assuring that an attack against a member nation would commit the allies to come to its assistance. Both aims, however, relied on transatlantic assistance. From the outset, the European nations were aware that their own economic and military resources were insufficient and that their alliance had no meaning without American engagement. While the Brussels Treaty actually referred to a German rather than a Soviet threat, the British had made it clear to the Americans that they saw the treaty as the groundwork for a broader Atlantic cooperation directed specifically against the Soviet Union. Moreover, shortly before the treaty's birth, the communist coup in Prague in February 1948, which placed Czechoslovakia under Soviet control, caused concerns about Soviet expansionism. By the signing of the treaty, US President Truman stated that the United States would "by appropriate means, extend to the free nations the support which the situation requires", and by the end of March, George Marshall invited Britain and Canada to secret tripartite talks on Atlantic security.[132]

This set the stage for the so-called Washington Exploratory Talks, which took place from July to September 1948 between the ambassadors of the Brussels Treaty nations, Canada, and the United States, resulting in a non-binding agreement for a North Atlantic security arrangement.[133] Subsequenty,

---

[131] Ismay, *NATO. The First Five years*, p. 8.

[132] Truman is quoted in Kaplan, *A community of interests*, p. 14. See also Kaplan, *The Long Entanglement*, p. 30; Ireland, *Creating the entangling alliance*, pp. 63-66. In the Treaty, Germany was specifically mentioned in the preamble and in Article VII which stated that the Consultative Council should be convened in the case of a renewal by Germany of an aggressive policy in order to work out the attitude to be adopted and the steps to be taken. It was mostly France who had concerns about its neighbour country since the American policy on Germany was to regenerate an economic strong West Germany.

[133] The Truman Administration was reluctant to embark on a commitment to defend Western Europe in the form of an entangling alliance, but events in June 1948 paved the way for a course change, namely the beginning of the Soviet blockade of West Berlin which added fuel to the fear of Soviet aggression, and the US Senate passing of the Vandenberg resolution allowing the government to pursue regional or collective arrangements for security. Moreover, the UK emphasised that American participation in a Western defence alliance would convince France to accept the American plans for Germany. See: Park, *Defending the West*, p. 6; Kaplan, *The Long Entanglement*, p. 3, 10f.; Kaplan, *A community of interests*, p. 18; Olesen, "Den Kolde Krigs Historie", p. 20f.; Leffler, *A Preponderance of Power*, p. 211. For the result of the Washington Exploratory Talks, see The Washington Paper, September 9 1948. FRUS 1948, vol. III,

negotiations for a North Atlantic security pact also involving North Atlantic territories of other Western European countries continued throughout 1948. The vision in the US administration was to integrate Western Germany into Western Europe, but since this arrangement was regarded with scepticism in France, the American estimation was that a treaty could convince the French that their security was guaranteed.[134] On April 4, 1949, the North Atlantic Treaty was signed by the seven countries participating in the Washington talks along with Norway, Denmark, Iceland, Portugal, and Italy.[135] Hereby, the Brussels Treaty had achieved a vital purpose, namely that of an American security guarantee towards Europe.

At this point, the strategy for defending Western Europe was that of the 'tripwire', according to which Europe would effectively have been abandoned in the first phase of a war and recaptured in a counter-attack. In this way, defence spending could be kept to a minimum, while the Western European countries were still struggling to recover economically after the Second World War.[136] This strategy, however, relied on the US nuclear monopoly. When the Soviet Union tested an atomic bomb in August 1949, it caused worries about the military weakness of Western Europe. As a result, the United States increased its military aid to Western Europe.[137] This marked a turn, since the Truman administration when launching the European Recovery Program (ERP), also known as the Marshall Plan, the year before had found that civilian economic aid should be prioritised over military aid to begin with.[138] Moreover, with the 'medium-term defence plan' (MTDP) agreed upon in April 1950, an actual plan for defending Western Europe on the ground – and more specifically, at the Rhine – was in place.[139] The outbreak of the Korean War in June 1950 became a further catalyst for the build-up of a defence of Western

---

doc. 150. For an in-depth analysis hereof, see Petersen, "Bargaining Power among Potential Allies".

[134] Leffler, "The Emergence of an American Grand Strategy, 1945-1952", p. 81. Denmark and Norway was informed in September 1948 that they would receive an invitation for joining an Atlantic Treaty, see DIIS, *Danmark under Den Kolde Krig*, I, p. 141.

[135] Besides these countries, Sweden and Ireland had also been in the picture, but declined an invitation to join the Atlantic Treaty. See: Kaplan, *The Long Entanglement*, p. 16.

[136] Trachtenberg, *A Constructed Peace*, p. 95f.

[137] This happened formally with the signing of the Mutual Defence Assistance Act in October 1949 and the establishment of the Office of Military Assistance in order to coordinate defence aid to the North Atlantic allies. In January 1950, bilateral agreements on aid programmes to eight European NATO allies were entered. See Ismay, *NATO. The First Five years*, p. 23f.

[138] The ERP came into being with the passing of the Foreign Assistance Act in the beginning of April 1948. The first phase of the programme from 1948 to 1950 focussed on economic reconstruction. Kaplan, *The Long Entanglement*, p. 9; Kaplan, *A community of interests*, p. 19f.

[139] Trachtenberg, *A Constructed Peace*, p. 95f.; Kaplan, *The Long Entanglement*, p. 59.

Europe. The North Korean attack on South Korea gave rise to the concern that a similar situation could break out in divided Germany.[140] Prior to the outbreak of the Korean War, the North Atlantic Council had discussed the prospects for creating an integrated military force adequate for the defence of Western Europe, and in the United States, the National Security Council had recommended President Truman to engage in a massive rearmament through a rapid build-up of air, ground, and sea forces, and of nuclear forces too.[141] These thoughts were now given new relevance.

Catalysed by the Korean War, the primary focus within the North Atlantic Treaty cooperation shifted from political to military concerns. As explained by the French historian Frédéric Bozo, defence in the narrow sense now prevailed over security in the wider sense.[142] In September 1950, the United States presented a proposal to establish a common European military command system led by an American supreme commander in control of standing, integrated forces. Upon discussion, the North Atlantic Council agreed on a plan calling for "the establishment at the earliest possible date of an integrated force under centralized command and control composed of forces made available by Governments for the defense of Western Europe".[143] The American proposal included West German forces, and thereby German rearmament – an issue that the West European allies, not least France, had hitherto greatly opposed. However, it was now increasingly clear that the question of German forces was central for the realisation of the 'forward defence' strategy, according to which the line of defence was to be placed as far to the East as possible. This resulted in a proposal for rearming Western Germany within the context of a European army.[144] In December 1950, the

---

[140] For instance, the German chancellor Konrad Adenauer noted: "I am convinced [...] that Stalin has the same plan for Europe as for Korea. What is happening there is a dress-rehearsal for what is in store for us here". (Quoted in Park, *Defending the West*, p. 16). Today, we know that this was not Stalin's plans. As the historian Wilfried Loth has observed, it is uncertain what would have happened to the plans for Western military integration without the Korean War. See: Loth, "The Korean War and the Reorganization of the European Security System, 1948-1955", pp. 485-486.

[141] This recommendation was formulated in the decisive policy paper NSC 68. See: NSC 68, US Objectives and Programs, April 7 1950. FRUS 1950 vol. 1, pp. 235-292; Leffler, "The Emergence of an American Grand Strategy, 1945-1952", p. 83f.; May, *American Cold War Strategy*, p. vii; Trachtenberg, *A Constructed Peace*, p. 99f.

[142] Bozo, "Defense Versus Security?", p. 86.

[143] C5-D/11(Final), September 26 1950. NA.

[144] The forward defence strategy was adopted with the Medium Term Defence Plan in April 1950 and was a departure from the 'peripheral strategy' which involved withdrawing from the European continent, relying primarily on air and naval power. As for German rearmament, the French Minister of Foreign Affairs Robert Schuman called it unthinkable "that Germany could be allowed to adhere to the Atlantic Pact as a nation capable of defending itself". The establishment of a European Defence Community, including German troops, was presented by the French Prime Minister René Pleven in October 1950 and lead to the signing of a treaty in May 1952. See: Trachtenberg, "The

Military Committee presented a report stating that "[i]n order to defend Western Europe to the maximum extent practicable, national forces which are to be contributed for this purpose must be formed into a unified whole". According to the report, this required the establishment of an integrated force led by a supreme allied commander.[145] This proposal was approved by the defence and foreign ministers of the North Atlantic Treaty member states on December 18, and the following day, the American general Dwight D. Eisenhower was appointed as the first Supreme Allied Commander Europe (SACEUR). Thus, the North Atlantic Treaty transformed from a tool of political reassurance into an actual defence organisation with a military command and integrated forces.[146] In continuation, the financial aid to the European allies provided through the European Recovery Program was converted to being directly attached to defence build-up.[147]

The technopolitics of 'common infrastructure'

It is in this political and military context that the cooperation on infrastructure emerged, first among the Brussels Treaty nations and then within the context of NATO.

After the signing of the Brussels Treaty, the five member states began studying their military needs. In September 1948, they set up the Western Union Defence Organisation (WUDO) with headquarters in Fontainebleau south of Paris. The following year, after the North Atlantic Treaty had been signed, WUDO agreed on a plan for the defence of Western Europe.[148] Subsequently, a 'short term plan' was drafted, which, besides rearming forces and providing them with modern equipment, also called for the construction of "infrastructure".[149] Infrastructure was a term that the WUDO nations

---

Nuclearization of NATO and U.S.-West European Relations", p. 414; Park, *Defending the West*, p. 16f.; Leffler, "The Emergence of an American Grand Strategy, 1945-1952", p. 86.

[145] "Report by the North Atlantic Military Committee to the North Atlantic Defense Committee", DC 24/3, December 12 1950. FRUS 1950, Volume III, doc. 306.

[146] Further to the Allied Command Europe (ACE) commanded by SACEUR, the allies also established the Allied Command Atlantic (ACLANT) commanded by SACLANT. Enclosure A to SGM-1180-53, August 3 1953. NA.

[147] This happened with the Mutual Security Act of 1951. Jensen, "Marshallplanen", p. 423.

[148] This resulted in the 'Luxembourg Targets' for the increase of national forces. WR/FC(50)22(Final), April 24 1950, Enclosure to SG 35. NA; Park, *Defending the West*, p. 14.

[149] WR/FC(50)22(Final), April 24 1950, Enclosure to SG 35. NA. Since it lies beyond the scope of this dissertation to study the Western Union's work on infrastructure in detail, I have not consulted archive material from WUDO. Instead, I build my examinations on early material from NATO and material on US foreign relations.

borrowed from the terminology of the French army, where it referred to "fixed installations necessary for the support of an army".[150]

Whereas all five countries needed to construct new infrastructure such as pipelines within their own territory, some of the needed facilities such as airfields, headquarter installations, and communications were regarded to be of a more common character and therefore planned to be jointly constructed. On a more detailed level, the elements contained in the infrastructure project had been reached on the basis of national studies of needed infrastructure facilities followed by collective negotiation hereof. For instance, concurrently with the short term plan, a specific 'Signal Infrastructure Plan' was, according to a later note, worked out in the following way:

> "It was built up by consolidating the communicating requirements of the Western Union Armies, Navies, Air Force and Civil Air Defence by matching these against existing resources and, after thorough discussions with National Post and Telegraph authorities and manufacturing agencies, by agreeing on the most economical and effective layout."[151]

As such, the plan was the result of a mutual orientation between military and civilian actors taking both political, technical, and economic perspectives such as the man-power and manufacturing capacity into consideration. The plan was "devised to fill in gaps, strengthen weak links, and provide alternate outlets" in the existing communications infrastructure. However, as it was difficult for the national telecom authorities to assess how much of the existing civil network that could be made available for military use, a figure rule was worked out according to which "50% of existing or firmly planned civil telecommunication facilities was deemed to be available for military use in emergency".[152]

In total, the infrastructure installations that were identified as jointly necessary amounted to a total cost of around 32 million pounds sterling. The question was how this cost should be allocated among the five members. In WUDO, the defence and finance ministers primarily met in separate forums, for which reason there was often a discrepancy between what was regarded militarily and financially recommendable. This was also the case with the infrastructure programme. When the finance ministers met in January 1950, they could not agree on authorising the funds for further programmes within

---

[150] "SHAPE History Volume I", pp. 19, 279. NA. For more on the history of the term, see: van Laak, "Der Begriff "Infrastruktur" und was er vor seiner Erfindung besagte"; van Laak, "Technological Infrastructure, Concepts and Consequences"; Jensen, "Connecting the Alliance".

[151] Note on the European Signal Infrastructure Program, June 1951. NA.

[152] Ibid.

the Western Union. In particular, the British were reluctant to accept a commitment to defend the continent, also financially, and the sticking point about the infrastructure installations was that most of them would be constructed in France, where the headquarters was based. But in April 1950, when a joint council of foreign, defence, and finance ministers met, they reached an understanding in principle to support the infrastructure programme. Here, the British Defence minister declared that he had realised that the burden of the programme would fall disproportionately heavy on some allies more than others, and that the UK were willing to contribute – on the condition that the programme should be reduced to the absolute minimum.[153]

The signal infrastructure plan both involved constructing infrastructure of a purely military nature, such as signal installations in headquarters or for air defence, and work which involved the civil PTT networks in the member states such as extension of long line cables and equipping of existing PTT installations. The peculiar thing about these signal installations was that some of the work once completed would "represent a not inconsiderable increase in capital value to the economy of the country concerned". The WUDO nations estimated that the signal infrastructure of purely military interest amounted to 4.4 million pound sterling, and the rest to 19.1 million pound sterling – of these, 12.3 million were of entirely economic interest to the PTTs. Much of the work was to be carried out by the French PTT.[154] At this point, the French telecom sector suffered from credit shortages causing network developments to stagnate.[155] Thus, while it was vital for the Western Union that these works were completed soon, they were not necessarily installations of particular urgency for the French PTT.

After thorough negotiations, the five nations agreed on a cost sharing principle for the common infrastructure project in which France carried the heaviest burden, but where costs of the signal work of a purely military nature were divided among them.[156] This project, which was later referred to as the first 'slice', involved extensive cable construction works. Within the French territory alone, a total of 963 kilometres of cable was constructed, divided into thirteen different sections. In Luxembourg, a cable was constructed in order to link up infrastructure in France with Western German networks, and in Belgium, links were made to France and the Netherlands, where domestic connections were improved. Moreover, the UK was linked better with the

---

[153] van Tets, "The Birth and Significance of Common Infrastructure", pp. 50-53; Thies, *Friendly Rivals*, pp. 106-107; Kaplan, *A community of interests*, p. 167; Ismay, *NATO. The First Five years*, p. 114.

[154] Annex II, WR/FC(50)22(Final), Enclosure to SG 35. April 24 1950. NA.

[155] For this reason, while the number of telephones doubled in Europe between 1945 and 1955, they did not grow more than 50% in France. Laborie, "A Missing Link?", p. 194.

[156] Annex II, WR/FC(50)22(Final), April 24 1950, Enclosure to SG 35. NA.

continent, both by repairing and diverting existing submarine cables and by constructing a new one.[157] As it appears, it was in particular border-crossing connections that were needed for the defence cooperation among the five nations.

For the national PTTs, it was not uncommon to contribute to defence efforts, but it marked a turn that it now took place in an international setting. In this sense, WUDO's cooperation on establishing new communications infrastructure was ground-breaking as it initiated a new kind of cooperation across borders. Moreover, it marked the beginning of a new kind of civil-military cooperation on telecommunications. As a later briefing in a specialised communications committee in NATO commemorated:

> "In 1949 the military decided to integrate their operational long lines networks in the existing and planned national fixed (PTT) networks. [...] From then on, military planning was no longer a specialized military affair, but one which required coordination with Civil Authorities (PTTs)."[158]

Thus, what emerged among the WUDO allies was a 'layered' communications infrastructure. The concept of infrastructural 'layeredness' has been used by historians to stress how infrastructures can be deeply embedded within and dependent on other infrastructures or technologies. This means, moreover, that such infrastructures have different past visions and practices encapsulated in their materiality.[159] As I shall get back to later in this chapter, the layeredness gave rise to a number of challenges as regards the organisation of the use of the infrastructure, which had to be balanced between both military and civilian and international and national needs.

Communications infrastructure for an integrated defence

In the beginning of 1951, the newly-appointed SACEUR, General Eisenhower, arrived in Paris and began the build-up of his new command. In April, the Allied Command Europe and its headquarters, the Supreme Headquarters Allied Powers Europe (SHAPE) was activated. With this new intense focus on defence build-up and military integration, the infrastructure programme of WUDO, not least the signal communications projects, gained new importance.

Prior to the establishment of SHAPE, a number of regional planning groups subordinated to the Military Committee had coordinated defence

---

[157] SACEUR's Periodic report to the SG no. 9, October 12 1951. SHAPE/573/51, enclosure to SG 120/9. NA. See also Report on physical progress of infrastructure, November 16 1951. MC 32. NA.
[158] Summary of the ELLA briefing to the Committee, April 2 1957. AC/121-WP/1. NA.
[159] Marklund and Rüdiger, "Historicizing Infrastructure", p. 15; Jackson et al., "Understanding Infrastructure".

planning within the different territories of the North Atlantic Treaty area, one of them being the Western Union. In September 1950, the Standing Group encouraged the regional planning groups to take the term of infrastructure in use in their planning – with reference to what the Brussels Treaty nations were already doing. For this purpose, infrastructure was defined as:

> "the static items of capital expenditure which are required to provide the material backing for operational plans necessary to enable the higher command to function and the various forces to operate with efficiency."[160]

The Standing Group also called attention to the necessity to include general, and not only military, infrastructure into the planning. It emphasised that the term infrastructure in its military context only covered a part of the static installations of a territory the whole of which served to permit the development and most efficient use of its available resources, and that it could be necessary, also for strictly military reasons, to develop or augment the existing civilian infrastructure of a territory.[161]

In this way, infrastructure was perceived as a critical element ranking alongside other organisational and material aspects related to the build-up of forces. With the activation of SHAPE in April 1951, the regional planning groups were disbanded, and the Western Union's cooperation on infrastructure was transferred to SHAPE.[162] In a periodic report to the Standing Group in April 1951, SACEUR emphasised that one of the matters of highest priority was the acceleration of the infrastructure programme.[163] SACEUR called for a conference of senior signal and communication officers to be held at SHAPE by the end of June 1951 "to discuss general communications policies and problems".[164] A document available in the NATO Archives from June 1951 contains a review of the "European Signal Infrastructure Program". The review is probably produced in connection with the conference held in SHAPE and likely made by SHAPE personnel. In the document, WUDO's signal infrastructure plan is reviewed with the purpose of adapting the plan to the current needs of the alliance.[165] Since the first slice of WUDO's programme had been cut down to a minimum, the original plan included signal projects which were not shortlisted in the first place. SHAPE recommended in the June

---

[160] Note on definition of infrastructure, September 8 1950. SGM-313-50. NA.
[161] Ibid.
[162] On the integration of WUDO into NATO, see Rohan, *The Western European Union*, p. 31.
[163] Appendix to Enclosure to SG 120/2, April 19 1951. NA.
[164] Appendix to Enclosure to SG 120/6, July 7 1951. NA.
[165] Note on the European Signal Infrastructure Program, June 1951. NA. Upon my request, the archivists in NATO have not been able to find out more about the origin of the document.

1951 review that these should be installed as devised, since they were "designed to produce a balanced and integrated Telecommunication System" in the area that the short-term plan covered. Curtailment or postponement hereof should be avoided, the document noted, "as it would have unbalancing repercussions on the whole Telecommunication System as envisaged".[166]

These signal projects – all of which were related to the long line cable network – therefore became part of the second slice of the infrastructure programme in what was now NATO's central region. This slice contained thirteen new airfields, extension of eight existing airfields, and fifty-three signal communication projects.[167] For instance, a submarine cable was planned between the UK and the Netherlands and on the continent, a large number of landlines and repeater stations was scheduled to be established – the majority of them, again, in France.[168] The signal projects carried 61.1 per cent of the total budget of this slice, which was estimated to cost around 79 million pounds sterling.[169]

This amount would be difficult to raise by the countries of NATO's central region alone, but since the United States and Canada also planned to assign forces to SACEUR, they were expected to contribute to the financing of the second slice too.[170] A cost-sharing agreement for the second slice was agreed upon at the North Atlantic Council's ministerial session held in Ottawa in September 1951.[171] Two remarks must be made in relation to the Ottawa

---

166 Ibid.

167 Appendix G to Enclosure to MC 32, November 16 1951. NA; Kaplan, *A community of interests*, p. 167; Ismay, *NATO. The First Five years*, p. 115.

168 Report on Working Party of Signals Experts, September 24 1951. AC/4-D/26. NA.

169 Later, in December 1953, the estimated cost was raised to around 124 million pound sterling. By comparison, signal projects had carried 45.5 % of the budget of the first slice. Ismay, *NATO. The First Five years*, p. 115; NATO, *50 Years of Infrastructure*, p. 23f.; "SHAPE History Volume I", p. 281f. NA.

170 With the purpose of working out the cost-sharing hereof, a 'Special Committee' (later made permanent and renamed the Infrastructure Committee) was established with military and financial experts from all NATO member states. The committee both considered a 'capacity-to-pay'-criterion calculated on the basis of GNP and a 'user nation'-criterion according to which the cost of the infrastructure installations would first be covered by the host government and thereupon leased by other NATO countries who deployed military personnel in the area concerned. The first proposed cost-sharing model was favoured by the continental European nations and the latter by the US, UK, and Canada. The Special Committee ended up recommending a method of cost sharing that was not based on a formula, but on preceding negotiations. See: Memorandum on the financing of infrastructure, May 10 1951. D-D(51)130(final). NA; Memorandum on policy on US participation in financing NATO Infrastructure, June 26 1951. FRUS 1951 Vol. III, part I, doc. 116; van Tets, "The Birth and Significance of Common Infrastructure", pp. 53-54; Thies, *Friendly Rivals*, p. 107.

171 It followed frim this agreement that the total cost of the second slice of 79 million pounds would be apportioned so that the United States paid 38, France 17, the United Kingdom 14, Canada 3.5, the Netherlands 2.3, and Belgium and Luxembourg together

agreement. First, with the agreement, the burden-sharing principle and the understanding of common infrastructure was confirmed. Prior to the Ottawa meeting, the Standing Group of the Military Committee had reviewed the definition of infrastructure presented to the regional planning groups the year before. The Standing Group came to the conclusion that it was necessary to make a distinction between national and common infrastructure according to which each nation should finance and execute works of infrastructure required solely for its own forces, whereas the common infrastructure programmes should only be concerned with infrastructure of common interest to two or more nations.[172] In NATO, the basic principle for defence build-up was that each national government was responsible for the logistic support of its own forces.[173] But common infrastructure differed from other logistic tasks due to its border-crossing importance. In this way, the infrastructure cooperation was the "aspect of the Alliance which came nearest to supranationalism", as Robert S. Jordan has noted.[174]

Second, the US contribution to the second slice, which accounted for almost half of the total cost, must be understood as supporting a broader American political agenda for Western Europe. As highlighted in previous historical research, the construction of an integrated Western European defence system was a high-prioritised task for US administrations in the early 1950s.[175] When Eisenhower entered the post as supreme commander in early 1951, he had declared that in the long run,

> "there is no defense for Western Europe that depends exclusively or even materially upon the existence, in Europe, of strong American units. The spirit must be here and the strength must be produced here. We cannot be a modern Rome guarding the far frontiers with our legions if for no other reason than that these are *not*, politically, *our* frontiers. What we must do is to assist these people [to] regain their confidence and get on their own military feet."[176]

4.2 million pounds. See: D-D(51)248, September 19 1951. NA; "SHAPE History Volume I", p. 281f. NA; Kaplan, *A community of interests*, p. 167.

[172] September 6 1951, Enclosure 1 to SHAPE/449/51. NA.

[173] This agreement was reached at the North Atlantic Council meeting in December 1950. See: "SHAPE History Volume I", p. 257; DC 24/3, 12 December 1959; DC 24/3(Final), December 18 1950. NA.

[174] Jordan, *The NATO International Staff/Secretariat 1952-1957*, p. 265.

[175] See for instance McGlade, "NATO Procurement and the Revival of European Defense, 1950-60", p. 16.

[176] Eisenhower to Bermingham, February 28 1951, in Galambos ed. *The Papers of Dwight David Eisenhower XII*, pp. 76-77. See also Trachtenberg, *A Constructed Peace*, p. 147.

As such, Eisenhower made it clear that sooner or later the Europeans would have to defend themselves.[177] For the moment, however, Eisenhower's impression was that the European allies were still too weak to stand on their own and that the United States therefore had to make it clear that they "meant business" and take the lead in organising a defence system.[178] This included financing infrastructure for common use.[179]

At this point, the infrastructure programme only covered NATO's central region, and, as the US Secretary of State Dean Acheson underlined in the fall of 1951, the accomplishment of the second slice projects "is no more than [a] start of [the] infrastructure program".[180] Since the spring, when SHAPE had adopted the infrastructure programme, plans for broadening the programme to the other NATO regions had been considered. As for signal infrastructures, the review conducted by SHAPE in June 1951 of the original WUDO plans called attention to the fact that the plan only covered the area west of the Rhine. Therefore, SHAPE initiated an examination of the corresponding needs in the northern and southern region of SHAPE's responsibility.[181]

In this planning, SHAPE involved the national civilian telecom authorities in the member states. For instance, as Danish records reveal, the Danish tele administrations were asked in March 1951 to appoint a delegation consisting of three persons to participate in the work of an Atlantic committee. The military officer who made the request did not specify which committee he referred to, but he underlined that the reasoning behind this was that the allies now had "a fully finished plan for the coordination of telephone connections between these countries" – probably a reference to the countries which were not yet covered in NATO's infrastructure planning. According to the officer, this plan was now to be discussed with the national telecom authorities in order to make sure it could be carried through.[182]

---

[177] Eisenhower's determination to withdraw US troops from Europe was made even clearer when he later, in November 1952, was elected US president. Here, he underlined that Europeans should accept the principal responsibility for their own defence and that this implied European troops to be mobilised more fully. See McMahon, "US national security policy from Eisenhower to Kennedy", p. 297.
[178] Trachtenberg, *A Constructed Peace*, p. 147.
[179] This was for instance stressed by President Truman when asking his Secretary of State, Dean Acheson, to make sure that foreign assistance funds to Europe was used most effectively. See: Letter from the President to the Secretary of State, September 24 1951. FRUS 1951 Vol. III, part I, doc. 155.
[180] Telegram to US Deputy Representative on the NAC, October 15 1951. FRUS 1951 Vol. III, part I, doc. 175.
[181] Note on the European Signal Infrastructure Program, June 1951. NA.
[182] Minutes of SU meeting, March 29 1951. TM, TTS, Bilag til samarbejdsudvalgets møder. RA.

SHAPE's examination of the northern region revealed "Several vital communication bottlenecks" as well as a lack of direct routes between Norway, Denmark, and the United Kingdom. Additionally, the examination pointed out the far from optimal circumstance that all communication routes from the Netherlands went through Western Germany, at this time not a NATO member. However, planning for a defence of the Northern Region was challenged by the fact that NATO's defence plans for this flank were not yet settled. Therefore, the signal infrastructure plan was "based on producing a reasonably secure network which we hope will be adequate to serve whatever Military plan for the North may ultimately be produced". For the Southern Region, for which SHAPE also had no settled defence plans, similar problems of big distances, sea gaps, and incoherent networks were identified.[183]

Through 1951, the infrastructural needs of the central, northern, and southern regions were further negotiated, and in the beginning of 1952, plans for a third slice of the infrastructure programme including Denmark, Norway, and Italy were on the table. The third slice was discussed at the February 1952 ministerial session of the North Atlantic Council in Lisbon. At this session, agreements were reached on an immense reorganisation of the military and political structure of the alliance, making NATO a permanent organisation with a secretary general, an international secretariat, a permanent North Atlantic Council, and headquarters in Paris. Moreover, the member states agreed to embark on massive rearmament efforts with the goal of establishing 96 NATO divisions by 1954, and the enlargement of NATO to include Greece and Turkey was accepted.[184] The increased mobilisation and new force goals were reflected in the third slice, which included fifty-three new airfields, twenty-seven extensions to existing airfields, fifty-eight communications projects, and ten new headquarters, adding up to a cost of 152 million pounds sterling. Once again, now with ten contributors to the programme, it proved extremely difficult to agree on cost allocations, since member states were also challenged by the general pressure for increased defence spending and the fact that the second slice already appeared to be much more expensive than expected.[185]

In general, the problem of how to balance military security with economic security was a topic of heavy discussion in NATO's early years.[186] The balancing of defence expenditures with general societal economic considerations in Western Europe led to conflicts among the allies on what could be included within the definition of 'common infrastructure'. A working group established with the purpose of working out a more clear-cut definition

---

[183] Note on the European Signal Infrastructure Program, June 1951. NA.
[184] Wenger, "NATO's transformation in the 1960s", p. 222; NATO, *50 Years of Infrastructure*, pp. 24-25.
[185] Ismay, *NATO. The First Five years*, p. 115; "SHAPE History Volume I", p. 243.
[186] Milward, "Different Securities?", p. 15.

concluded in the beginning of 1953 that "a rigid and academic definition" would have the consequence that too many projects could potentially be included in the common funding.[187] Instead, the working group argued that future projects should always be examined according to a list of criteria, whereupon member countries would negotiate if they should finance the proposed works in common. The criteria were that the projects applied to buildings and installations that were fixed, essential to the training of forces or implementation of the operational plans, and with a sufficient degree of common use or interest.[188] Since the communications projects constituted a special problem, the Infrastructure Committee set up a working party of signals experts with the purpose of screening all the communications facilities proposed to be included in the common infrastructure programme. The experts were asked to make sure that the new projects would be "kept to a strict minimum" and in all cases justified by common military needs. Furthermore, the experts should make sure that full use was being made of already existing or planned civilian facilities, also in case of emergency, and that the proposed signal installations were "linked to the civilian networks at the nearest points".[189]

By the mid-1950s, more than 300 communication projects covering the area from Northern Norway to Turkey had been launched, providing 16,000 kilometres of long lines cables, 10,000 kilometres of radio relay circuits and 1,700 kilometres of submarine cables.[190] In addition to this came the national infrastructure needed for defence communications for which each member state was responsible. As evident from above, NATO's international communications – that is, the infrastructure installations regarded to be necessary for more NATO nations, although it did not necessarily cross borders – relied on the use of the existing civilian communications infrastructure in Western Europe. This principle had been inherited from WUDO, but from the available archive material related to the infrastructure

---

[187] Draft report on definition of common infrastructure, January 20 1953. AC/29-D/3. NA. For the background of this working group, see also: Summary record of Council meeting, July 3 1952. C-R(52)14; Note on criteria, September 8 1952. AC/4-D/97; Note on working group on definition of common infrastructure, September 26 1952. AC/29-D/1. NA. For more on the problems of defining infrastructure and the national expectations to have projects included in the infrastructure programmes, see Jensen, "Connecting the Alliance".

[188] Draft report on definition of common infrastructure, January 20 1953. AC/29-D/3. NA. Later, however, as these criteria were applied in preparing the fourth slice, the negotiations came to a stalemate in December 1952. In April 1953, Secretary General Ismay was asked by the North Atlantic Council to devise a formula that would cover the fifth and sixth slices as well, and the Council agreed that future infrastructure planning should be carried out as three-year programmes in order to limit the tensions associated with their planning. See: Aspects of NATO, no. 12, 1982. PDD, NATO Non-Periodical. NA; Thies, *Friendly Rivals*, p. 109.

[189] Report by the Working Party of Signals Experts, August 30 1952, AC/4-D/93. NA.

[190] Ismay, *NATO. The First Five years*, p. 122; NATO, *50 Years of Infrastructure*, p. 52.

projects and the adoption of the programmes from WUDO, it appears that this principle was not questioned at this point.

The background for the reliance on civilian communications was addressed by SHAPE's Chief Signal Officer in December 1955, when he gave a presentation to the Military Committee in which he looked back at the past year's system-building in the area of communications:

> "When NATO was formed, the policy was adopted that the Commands would rent circuits from the national PTTs, that is, the civilian telephone companies of the various countries, rather than construct a military system."[191]

According to the Chief Signal Officer it "was felt that a military system would be too expensive".[192] This message was repeated a year later, when a general from SHAPE gave a briefing to the Council in which he underlined that it at that time had been "apparent that it would be economically impossible to construct and operate an exclusively military long lines system for all military headquarters and agencies of ACE [Allied Command Europe]."[193] The consequence of this decision was that NATO and the national defences would have to engage in a close cooperation with national civilian telecom authorities. I shall examine this aspect further in the following section.

Before doing so, however, I shall make another comment to the common infrastructure projects. Apart from the military value that these projects constituted, they were also important additions to civilian networks and thereby a reinforcement of the peacetime communication systems in Western Europe. This was for instance stressed at a later occasion, in 1957, in a survey in which the member states reported on their progress in the area of communications. The reply from France outlined how the country by 1950 had been linked up with capitals in the allied neighbour countries by a single cable only. With the extensions of transnational links carried out as part of the infrastructure programmes in WUDO and NATO, French connections to the capitals of the United Kingdom, Belgium, Germany, and Italy were now doubled.[194] From a security point of view, this meant that French transnational communications were less vulnerable to destruction in wartime, but from a peacetime, civilian point of view, the extensions created increased capacity in a period, where transnational communication in general increased. In these years, Western European PTTs were under pressure with increased demands

---

[191] Presentation made by SHAPE's Chief Signal Officer, December 12 1955. Enclosure to MRM-7-56. NA.
[192] Ibid.
[193] Briefing by General Garland, October 3 1956. Annex to C-R(56)53. NA.
[194] Replies for 1957 annual review, XII (France), August 9 1957. AC/121-D/9. NA.

for communication facilities, lack of materials, and credit shortages.[195] The construction work related to NATO signal infrastructure experienced similar problems. Delays in delivery of equipment, shortages of raw materials, insufficient capacity of factories and contracting issues slowed down the process.[196] Nonetheless, NATO's signal projects were brought to completion and this happened quite fast in comparison with other planned projects. It is therefore a reasonable assumption that the political and military awareness that went along with the NATO projects served as a catalyst for advancements.

Organising and distributing communications

Since the infrastructure projects were based on the use of national communications infrastructure, the design and management hereof also became a NATO concern. In this manner, telecommunications system-building was not only a question of building and connecting infrastructure, but also of solving problems related to the organisation and distribution of communications. As an April 1952 review from SACEUR called attention to, a problem was caused by the fact that for military communications

> "...a clear cut division between military and civilian requirements cannot be drawn with exactitude. Much of the military signal and electronics systems will be provided from national resources in long line and frequencies which of course are among basic national resources."[197]

Already when obtaining responsibilities for the signal area in the spring of 1951, SACEUR had initiated a study on the emergency use by SHAPE of governmentally and commercially owned communications.[198] When SHAPE was formally established and the regional planning groups phased out, the Standing Group pointed out in a note to SACEUR in June 1951 that among the problems likely to be the most difficult to resolve in the planned reorganisation were infrastructure and communications, because they involved using civilian resources to meet military requirements.[199] A month later, SACEUR came back with a proposal for a new arrangement. Emphasising that "European-wide Signal planning and coordination" affected both "international, national, and civil interests", SACEUR suggested to establish

---

[195] See for instance Laborie, "A Missing Link?", p. 194; Jacobsen, *Jydsk Telefon*, p. 87f. I shall elaborate further on this in the Danish context in chapter three.
[196] Note on the Physical Progress of Infrastructure, November 16 1951. Enclosure to MC 32. NA; "SHAPE History Volume 1", p. 283. NA.
[197] Review of the NATO Communications-Electronics Organization, April 16 1952. SGM-834-52. NA.
[198] SACEUR, Periodic report to SG no. 1, March 13 1951. Appendix to SG 120. NA.
[199] Memorandum from SG, June 11 1951. Enclosure to SG 103/5. NA.

three new permanent signal agencies: A European Long Lines Agency (ELLA), a European Frequency Agency (ERFA), and the European Military Communications Coordination Committee (EMCCC).[200]

The idea behind SACEUR's suggestion was that the EMCCC should be responsible for coordinating studies of what work needed to be done to implement the agreed signal communications plans. ELLA should coordinate "matters concerning the use of national telecommunications facilities in support of the military effort for the defense of Western Europe", while ERFA should coordinate matters concerning the use of radio frequencies for the same purpose.[201] Accordingly, since the defence planning relied on the use of national communication infrastructure, a better coordination between NATO military plans in Europe and national plans in the area of communications was necessary. Or, as the Standing Group emphasised: "Due to the vital importance of communications to the European operational commands and to the various national implications involved, some form of coordination in the communications sphere was found to be essential."[202]

Regarding ELLA, the reference to 'long lines' requires an explanation. Long lines refer to the lines in the long-distance telecommunications networks, such as for instance the cables connecting different cities or regions. The distinction between long lines communications and local communications reaches back to the early years of telephony, which at that point was a very local technology. In ELLA's terms of references, it was highlighted that the agency should maintain up-to-date information on telecommunications in Western Europe and that in cases where civilian interests were involved, ELLA's members – primarily military signal officers from the member states – were expected to obtain the official position of civilian national authorities. Thereby, ELLA would be able to coordinate the overall military requirements for

---

[200] Note by the Chief of Staff, SHAPE, to SG, July 6 1951, Enclosure to SG 153. NA. I have examined the establishment of these agencies in previous studies, although in less detail, but since in particular ELLA – later renamed ALLA – constitutes an important forum for international cooperation on security governance for the rest of the Cold War period, it is necessary to include the background hereof in this section. See: Jensen, "Connecting the Alliance", p. 198f.; Jensen, *Klartone efter atombomben*, p. 24f.

[201] Note by the Chief of Staff, SHAPE, to SG, July 24 1951. Enclosure to SG 153/1. NA. When the three committees met for the first time in September 1951, they decided that EMCCC and ELLA should be placed in Paris and ERFA in London. ELLA and ERFA were later renamed Allied Long Lines Agency (ALLA) and Allied Radio Frequency Agency (ARFA). See: Memorandum on the organisation of European signal agencies, September 21 1951. SGM-1539-51; Terms of reference for ALLA, February 2 1965. SGM-0034-65. NA.

[202] SG Progress report to the MC, MC 5/3, November 18 1951. NA.

telecommunications facilities and to determine how they would best be met by available facilities.[203]

When examining the records related to ELLA in the years following the 1951 establishment, the work carried out by the agency can be summarised in two categories: peacetime and wartime. The peacetime planning revolved around the coordination of technical and organisational matters with national telecom authorities. In April 1957, a briefing given by ELLA summarised that

> "Although the military, for obvious operational interests, would like to consider the joint national networks as an entity, in effect, the networks are technically and administratively national in nature."[204]

The coordination task carried out by ELLA involved the challenge that there were "considerable differences between nations in technical solutions and handling by PTTs".[205] Historically, the international agencies such as the ITU working to connect different national communications systems at borders have generally solved this problem by establishing 'gateways' that have made the different technological systems able to cooperate.[206] The challenge posed by ELLA was different, since it was also a matter of coordinating how domestic infrastructures were designed and handled. In the 1957 briefing, the ELLA representative further emphasised the challenge "of having one procedure for the NATO military on the one hand and respecting already existing PTT procedures on the other". He explained that "[t]he military often require PTTs to employ special techniques and to supply a type of facility which is not normally supplied to PTT customers." Therefore, the briefing continued, it had often been necessary to "add new facilities to the existing PTT networks" in order to "adapt the PTT networks to military requirements" – in practice, this meant "the "translation" of such NATO requirements into standardised national demands."[207]

In the first two years, ELLA, ERFA, and EMCCC were peacetime agencies planning with a view to wartime requirements. In April 1953, EMCCC suggested that the terms of reference for the three agencies should continue to be effective in the event of an emergency, a suggestion that was approved by the European Ministries of Defence.[208] One of the main tasks of the agencies

---

[203] Note by the Chief of Staff, SHAPE, to SG, July 6 1951, Enclosure to SG 153. NA; Report on terms of reference for the NATO communications agencies, June 1 1954. SG 28/2(Revised)(Final). NA.
[204] Summary of the ELLA briefing to the Committee, April 2 1957. AC/121-WP/1. NA.
[205] Ibid.
[206] Henrich-Franke, "Comparing Cultures of Expert Regulation", p. 281; Badenoch et al. eds., *Airy Curtains in the European Ether*, p. 17.
[207] Summary of the ELLA briefing to the Committee, April 2 1957. AC/121-WP/1. NA.
[208] Note on Communications in Time of Emergency, June 4 1953. C-M(53)77. NA.

was to plan how to best overcome deficiencies in existing facilities to meet the minimum foreseeable essential needs for the national and civil interests in wartime. In practice, given the way that the common infrastructure programmes were designed, national PTTs were in charge of installing and operating circuits to be used for wartime purposes. A general from SHAPE later explained how this arrangement worked:

> "For wartime use, a priority plan was developed by which additional circuits could be 'called up' and leased from the PTTs as the build-up of tension occurred between NATO and the Soviets."[209]

The general also added that this plan "was sound and reasonable except for one thing", namely that many of the PTTs did not have available the sufficient circuits required by the military in wartime – or even in peacetime.[210] Hence, NATO's defence plans relied on immense extensions of the national telecommunication networks. By 1955, SHAPE had made plans to have about 5,000 additional circuits placed into being as soon as an emergency was declared.[211] This arrangement necessitated a high level of preparedness planning on a national level. For this purpose, the member states were asked to establish a national equivalent to ELLA. It appears from the Danish and the British context that these National Long Lines Agencies (NALLAs) were established in 1954.[212] This is an aspect that I shall examine further in chapter five.

Concluding remarks

In this chapter, I have delved into the process of the 'networking' the allied nations in Western Europe in the early Cold War years. This took place first within the context of the Western Union Defence Organisation established between France, Britain, and the Benelux countries in 1948 and thereupon within the context of the North Atlantic Treaty cooperation. The fact that the establishment and connection of telecommunications infrastructure was on the agenda from the very beginning of the common defence build-up reflects the central role that communications were ascribed in modern defences and not least in international defence cooperation at this point.

---

[209] Briefing by General Garland, October 3 1956. Annex to C-R(56)53. NA.
[210] Ibid.
[211] Presentation made by SHAPE's Chief Signal Officer, December 12 1955. Enclosure to MRM-7-56. NA.
[212] Minutes of SU meeting, January 14 1954. TM, TTS, Bilag til samarbejdsudvalgets møder. RA; Memorandum on the United Kingdom National Long Lines Agency, November 28 1958, COS(58)265. DEFE 5/86. National Archives, UK.

In the first phase of telecom system-building in NATO, the main task was that of connecting the different allied territories of Western Europe, thereby preparing the continent for a future war. In this way, when viewed through the lens of technopolitics, it appears that telecommunications were designed and used strategically to enact a political goal, namely to form a crucial element in the military build-up of Western Europe catalysed by Soviet atomic bomb tests and the outbreak of the Korean War. When NATO's military commands – led by Americans – problematised how the lack of integrated telecommunication facilities among NATO's territories was a weak link, and how the effective management hereof in wartime was a vital task, it served the purpose of furthering the defence build-up. While NATO's cooperation on telecommunications infrastructure were of major importance for internal developments in the alliance – also on a symbolic level, as the internal publications from NATO suggest – the common signal infrastructure programmes appear significant in another way when understood in a broader context.

First, it represented a new kind of transnational cooperation on communications system-building. As this chapter has demonstrated, the agenda of common infrastructure and security problematisation of telecommunications created a momentum for establishing common telecommunications infrastructure. For the NATO allies, communications infrastructure was not only a national, but also a common concern, and the communication projects carried out in the infrastructure programmes were the result of multilateral, mutual negotiation among the member states. In this way, new trends in mutual defence planning led to new ways of cooperating on communications infrastructures. WUDO and NATO thereby became driving forces for establishing transnational communications infrastructure in post-war Western Europe. As illustrated in this chapter, many border-crossing facilities were constructed in relation to the defence cooperation which would perhaps otherwise not have been a top-priority at this point. Importantly, this transnational networking took place in a period, where domestic networks were underdeveloped, and the lack of resources, capacity, and capital posed challenges for further development. Moreover, contemporary attempts made at integrating Western European telecommunication facilities in supranational settings fell through due to national resistance from the telecom sectors. In the context of NATO, however, security concerns generally took priority over domestic sector concerns, and the fragile East-West relations in institutions such as the ITU were not given consideration.

Second, the consequence of this development was that civilian and public communications infrastructure in the member states was now made a NATO concern. Rather than constructing an isolated military system, a practice evolved in this initial phase of telecom system-building according to which the

military commands would rent circuits from the national PTTs. This resulted in NATO-funded construction of facilities which were recognised to be of primarily civilian interest, but important for defence purposes in the event of war. Since NATO developed a communications system based on resources of national public telecom authorities, the communications sectors in the member states became key actors in implementing a secure and reliable communications system for the alliance. In the following chapter, I shall explore how this networking of NATO appears from the perspective of Denmark.

As these military networking initiatives expanded well beyond defence purposes, NATO must be regarded as an important forum for telecommunications 'system-building' in post-war Western Europe. This aspect has not yet been acknowledged in historical research, but based on the empirical examinations carried out in this chapter, I suggests that we need to take the military system-building into consideration in order to understand post-war telecommunication developments in Western Europe. Certainly, it was the nation states who were responsible for constructing and operating the communication facilities, and, more specifically, this task was carried out by national PTTs. Yet, the politicisation of international telecommunication governance, which was both caused by geopolitical tensions and by the fact that communications technology was vital for offensive and defensive war planning, meant that national policies and practices on communications were increasingly formulated with a reference to security considerations and the NATO membership. This was for example illustrated with the 1949 ITU discussion on LORAN communications. In this way, as the following chapters of this dissertation will explore, the post-war reshaping of telecommunications set the scene for a larger interference of security policy.

[3]

Making the home front

Adapting the Danish telecom sector to the Cold War

In this chapter, I turn the focus to the Danish telecom sector. The NATO membership and the new security political framework of the Cold War ushered in a new situation for Danish politicians and actors in the telecom sector. As shown in chapter two, the cooperation in NATO both manifested in an increased need for communications facilities and, on a more abstract level, in the introduction of another kind of 'system-building' different from earlier traditions. In a Danish context, this meant that the telecom sector became increasingly involved in defence and security issues. This materialised in major construction works in order to provide sufficient communication facilities for international and national defence purposes and in a closer collaboration between defence authorities and the telecom sector than what had previously been the case.

This chapter delves into these developments with the purpose of demonstrating how the Cold War and the NATO membership altered existing policies and practices of telecommunication governance in the 1950s and early 1960s. In doing so, I suggest that defence and security problems became determining factors for developments in the Danish telecom sector in this period. I argue that the new security agenda found expression in two different ways. First, through the 1950s, as military authorities became more involved in public telecommunications, they also entered the scene as a new kind of stakeholder engaged in defining internal developments in the sector. Second, by the 1960s, a number of tasks related to military communications was transferred from defence authorities to the telecom sector, whereby the telecom sector acquired new responsibilities, which came to define it for the rest of the Cold War period. In this way, the chapter offers new perspectives to current understandings of both Danish defence and security politics and the developments in the telecom sector in the early Cold War period.

The chapter proceed as follows: First, I examine how the framework for civil-military cooperation on telecommunications was reorganised in response to Denmark's entry into NATO and the new defence agenda brought along by this reorientation and internationalisation of Danish defence politics. Second, I turn the focus towards the principal task in the civil-military cooperation on communications in the 1950s, namely that of meeting increased demands for telecom facilities for international and national defence purposes. I analyse how these needs were balanced with a pressing need for developing and

extending the civilian communication networks. Third, I examine the organisational changes introduced in the first years of the 1960s and discuss how these are to be understood vis-à-vis the governance of telecommunications. Before doing so, however, I shall shortly elaborate on the previous research on Danish security and telecommunications policies in the 1950s.

The 1950s: A decade of adaptation?

In Danish Cold War historiography, the 1950s have been described as a 'decade of adaptation' as regards Denmark's political and military integration into NATO.[213] As for the military aspects, historians have shown how the Danish defence was profoundly reorganised and reinforced during the 1950s. The military adaptation process was brought to an end around 1961/1962 with the establishment of an integrated command responsible for the defence of Denmark and Schleswig-Holstein.[214] Moreover, by the 1960s, with the help of substantial American military aid, the Danish defence had been built up to a state where it, to some extent at least, was able to take up the fight in case of an enemy attack while waiting for allied reinforcements. Prior to this, when NATO's line of defence was placed no further to the west than along the Rhine, it was, in reality, improbable that the Danish territory could be defended in case of an enemy attack.[215] As for the political aspects hereof, historians have paid particular attention to the 'defence opt-outs' that were formulated as part of Danish alliance politics in the 1950s: The rejection in 1953 of stationing

---

[213] This process has in Danish historiography often been studied through the lens of the 'alliance dilemma', inspired by the theory of the security dilemma in alliance politics and the abandonment-entrapment balance presented by the American political scientist Glenn Snyder. For this purpose, the Danish terms of *integration* and *afskærmning* [shielding] has been applied in order to understand Denmark's alliance politics, stressing both the wish for seeking security and protection by participating in NATO's common deterrence and, at the same time, a wish for shielding against those aspects of alliance politics regarded as disadvantageous for Danish security. See Snyder, *Alliance politics*, p. 4; Mouritzen, "Alliancedilemma", Petersen, "Abandonment vs. Entrapment", p. 183; Petersen, "National strategies in the integration dilemma"; Villaume, *Allieret med Forbehold*, p. 19, 26f.; Villaume, "Nato og Danmark 1949-72", p. 440f; Petersen, *Denmark and NATO 1949-1987*, p. 14f.

[214] The Allied Forces Baltic Approaches (BALTAP), an integrated command for the southern part of NATO's Northern Region responsible for the defence of Denmark and Schleswig-Holstein and thereby the access to the Baltic Sea. BALTAP consisted of air, naval, and land forces, all under the command of a Danish chief (COMBALTAP) with headquarters in Karup in Jutland. See Lammers and Villaume, "Østersøkommandoen".

[215] Villaume and Olesen, *I Blokopdelingens Tegn*, p. 292ff.; DIIS, *Danmark under Den Kolde Krig*, pp. 661, 676. At times, the reception of military material from allies, primarily heavy weapon systems, amounted to around 40% of the yearly defence budgets. Petersen, "Forsvarspolitik", p. 277. The military integration took many shapes, e.g. in the introduction of new techniques, see for instance Stenak et al. eds., *Kold Krig*, p. 38f.

allied air forces, and the 1957 formulation of a reservation towards import of atomic weapons in peacetime.[216] Moreover, historians have noted how the defence build-up sparked political discussions on how to balance military expenditures vis-à-vis investments in the welfare state, but it is still an underexplored aspect how this balancing was put into practice.[217] In particular, much remains to be discovered as to how the defence mobilisation and the military integration into NATO affected other parts of the Danish society outside of the direct military sphere. In this context, Per Boje et al has argued that the Danish trade policy in the early Cold War years was based on a broad understanding of security that perceived growth, welfare, and democracy as enhancing in terms of security.[218]

This chapter offers a novel perspective by examining how the integration into NATO translated into concrete undertakings in a specific societal sector, namely telecommunications. Thereby, the chapter will demonstrate how the 1950s was also a decade of 'Cold War adaptation' for the telephone sector. For this purpose – building on this dissertation's theoretical framework of security governance and technopolitics – I understand 'adaptation' as a process in which adjustments to new circumstances happen in a dynamic interplay between different stakeholders, in this case politicians, civil servants, military personnel, and representatives from the telecom sector. Adaptation, according to this approach, was not a transformation process imposed on the sector from outside. Instead, it was a process of mutual negotiation in which the scope of action was also defined by technological capabilities and political possibilities.[219]

Thus far, the developments of the Danish telephone sector in the early Cold War years have primarily been studied from an 'internalistic' point of view, where changes have been explained with internal factors or domestic

---

[216] See for instance Petersen, "Forsvarspolitik", p. 277; Villaume, "Atomvåbenpolitik", p. 106f.; Agger and Wolsgård, "All Steps Necessary".

[217] In particular, the social democrats maintained how investments in the welfare state was just as important in the fight against communism as military investments, see Petersen, "Forsvarspolitik", p. 277. Bo Lidegaard has argued that this was possible due to a 'strategic alliance' between US administrations and the Danish social democrats that allowed Denmark to give the military build-up a lower priority in order to ensure welfare build-up. See: Lidegaard, "Et andet syn paˊ dansk diplomati", p. 521; Lidegaard, *I Kongens Navn*, p. 578ff. For more on the relation between the Cold War and the development of the Danish welfare state, see Petersen, "Velfærdsstaten". In international research, this balancing has been addressed with the concept of a 'warfare-welfare nexus'. This nexus has recently been addressed by Danish historians – although with a focus on the pre-Cold war period, see: Petersen and Sørensen, "From Military State to Welfare State". An important work on this nexus in the British context is Edgerton, *Warfare State*

[218] See: Boje et al., *Handelspolitikken som kampplads under Den Kolde Krig*, p. 412. The authors have however also noted that the relations between security, growth, and welfare is still underexplored in Danish Cold War research.

[219] It is neccessary to stress, therefore, that I do not use 'adaptation' as a theoretical concept. See above.

politics, while geopolitics or transnational influences have been more absent.[220] While these examinations have highlighted the difficulties faced by the sector in these years caused by financial circumstances and domestic politics, I shall suggest another perspective through which to understand the Danish telecom sector in the 1950s, namely as a vital element in building up the home front.

3.1 Civil-military cooperation on telecommunications

The question of how to organise civilian and military cooperation on telecommunications following the entry into NATO fed into an already ongoing discussion in the telecom sector related to the division of responsibility between the state and private actors. Therefore, in order to examine how the change in circumstances brought along by the Cold War affected the sector, it is necessary first to take a closer look at how the sector was organised.

Public-private organisation in the Danish telecom sector

Similar to the arrangement in most other European countries, postal, telephony, and telegraphy services were under the control of a government department in Denmark, namely the Post & Telegraph Services (P&T). This arrangement had roots in the 1897 law on telephony, which gave the Danish state a monopoly on carrying out telecommunications through the public network. However, the law provided the state with the possibility of giving other companies a concession for operating in different regions for a certain period. As previously mentioned, three companies were operating under concession in the post-war years: Kjøbenhavns Telefon A/S (KTAS), Fyns kommunale Telefonselskab (FkT) and Jydsk Telefon A/S (JTAS). KTAS and JTAS were joint stock companies, in which the government had taken over more than half of the subscribed capital, while FkT was a cooperative society in which the local municipalities within the Funen area were partners. Along with the P&T, these companies were referred to as the 'telephone administrations', a collective designation for the suppliers in the Danish telephone sector.[221] While the telephone companies each ran the local telephone traffic in their region, the inter-urban, i.e. long-distance, traffic and the international traffic was handled by the P&T. Moreover, the P&T also ran telegraph traffic, including wireless

[220] The telephone company JTAS's development in the post-war years has been dealt with in detail in Jacobsen, *Jydsk Telefon*, p. 75ff. Organisational and technological developments of the P&T has been examined in Blüdnikow, *Post og Tele under samme tag*, and the public-private division of responsibility between the P&T and the telephone companies in Blüdnikow, *Enhedsvæsenet*.

[221] Paper read before the ELLA meeting, October 1953. TM, TTS, Enhedssagen 1945-1966. RA; Jacobsen, *Jydsk Telefon*, p. 13; Blüdnikow, *Enhedsvæsenet*, p. 19f.

services, e.g. the coast radio stations; the local telephone traffic in certain regions, e.g. in Sønderjylland; and the state broadcasting service.[222]

Politically, telecommunications were under the jurisdiction of the Ministry of Public Works.[223] The General Directorate of the P&T was a department – in Danish referred to as an 'etat' – in the ministry, in the same way as the Danish State Railways and the Danish Road Directorate. With these departments, the Ministry of Public Works was closely intertwined with its spheres of responsibility. In the last resort, the Minister of Public Works was politically in charge of the area of telecommunications. In the period under study in this chapter, the ministry was primarily headed by social democratic ministers, apart from the years 1950 to 1953 where it was headed by conservative ministers.[224] Supervision of and coordination within the telephone sector happened in the context of the Telephone Control Board [Telefontilsynet], a committee established under the Ministry of Public Works in 1919. The Control Board supervised the development in the telephone sector and oversaw that the private telephone companies operated in line with the concessions, for instance as regards tariffing. In 1948, a Coordination Committee [Samarbejdsudvalget] with representatives from the P&T and the telephone companies was established under board with the purpose of coordinating the technological development and furthering standardisation within the sector.[225]

In the early post-war years, the division of responsibility between the P&T and the three telephone companies was brought up for discussion. Ahead of this, a state takeover of the telephone sector had been considered on more

---

[222] The long-distance telephone service was referred to as Rigstelefonen. The P&T's local telephone service, referred to as Statstelefonen, covered Sønderjylland [South Jutland] and Møn. Moreover, a number of smaller exchanges, e.g. in Skagen and on smaller islands, were operated by Statstelefonen until handed over to the telephone companies during the 1950s. See Blüdnikow, *Post og Tele under samme tag*, p. 41, 63, 71f.

[223] The ministry, responsible for traffic and communication matters, was first founded in 1892 in connection with a reorganisation of the Ministry of Interior. It was renamed the Ministry of Traffic in 1987, a name that had also been used informally prior to this. Of the areas serving under the Ministry of Public Works in the period under study, traffic maters generally attracted the most political attention, e.g. the large-scale and long-term development plans for the extension of traffic infrastructure in Denmark launched in the 1950s. Due to the advanced technological character and the peculiar organisation of telecommunications, large-scale planning in this area was a special task that was not in the same way integrated into the general large-scale infrastructure planning. See Jørgensen, "Velfærdsstaten sættes på hjul", pp. 114-122; Hertz, "Ministeriet for Offentlige Arbejder"; Kaarsted, *De Danske Ministerier 1929-1953*, p. 478; Kaarsted, *De Danske Ministerier 1953-1972*, pp. 332f. 364. 426f.

[224] See Statsministeriet, "Regeringer siden 1848".

[225] From 1962, *Samarbejdsudvalget* was renamed *Samordningsudvalget* and its purpose was slightly changed. I shall get back to this in section 3.3 My use of the English term the Coordination Committee refers to both. For more on regulation and coordination of the sector, see Henten, "Dansk telefonhistorie", p. 13f.; Blüdnikow, *Enhedsvæsenet*, p. 78f.

occasions, as the 1897 law was based on the expectation that the development in the telephone sector would in the end lead to a unitary system driven by the state – in Danish coined as an 'enhedsvæsen'.[226] However, when the expiry of the concessions granted to the telephone companies approached in the late 1910s and again in the late 1930s, the governments in office found that economic conditions did not speak in favour of a state takeover at that point.[227] In 1938, the social democratic led government decided that the state, as a first step, should acquire the majority of the companies' shares and by 1952 take over all the telephone companies and form a united service under the P&T. While the first step was carried through with KTAS in 1939 and JTAS in 1942, the further plans were put on hold due to the Second World War and the German occupation of Denmark.[228] According to Mark Mau, who has examined the telephone sector during the German occupation in detail, these years disturbed the balance of power in the sector to the benefit of the telephone companies, who had argued heavily against a state take over.[229]

Thus, when the question of a state takeover of the telephone companies was brought up again after the Second World War, the situation was very different to the one foreshadowed in 1938. The state was, according to the concessions, authorised to redeem the remaining parts of the share capital in the companies, but in 1948, much to the annoyance of the P&T, the issue was postponed when the Minister of Public Works, social democrat Carl Petersen, declared that it was not the government's intention to do so at his point. Instead, the concessions were extended to 1962. This was done with considerations for the state of crisis that the telephone sector was in due to the general post-war monetary crisis and short supply situation and to the pending extension and modernisation of the telephone sector, which was also needed. In such a

---

[226] For a thorough examination hereof, see Blüdnikow, *Enhedsvæsenet*. Given the technical circumstance that telephony was mainly a local matter from the outset, a large number of local companies emerged in the late nineteenth century, but as technical possibilities for telephony over longer distances improved, many local services were centralised and the ground thereby prepared for a unitary system.

[227] The new concessions granted in 1920 contained a right for the state to take the majority control of the companies by the time of expiration of the concessions. Ibid., p. 28f.; Olsen, *Regulering af offentlige forsyningsvirksomheder i Danmark*, p. 274.

[228] Moreover, agreements were reached that 10 smaller companies in Southern Jutland were taken over by JTAS in 1939. The state also took majority control of Lolland-Falsters Telefon-Aktieselskab and Bornholms Telefon in 1939, and both companies were taken over by KTAS in the post-war years. A similar agreement as the one for FkT was made for Samsø Telefonselskab, until the company was gradually taken over by JTAS from 1948. See: Blüdnikow, *Enhedsvæsenet*, p. 45-61; Blüdnikow, *Post og Tele under samme tag*, p. 139ff.

[229] Mau, *Kampen om telefonen*, pp. 4., 40f., 278, 287. However, JTAS also tried to get permission for an extension of the concession and thereby avoid the 1942 state takeover of its majority share, but without success. See ibid., p. 284.

situation, the Ministry of Public Works found that larger organisational changes were inconvenient.[230]

Since the new concessions lasted for the period until 1962, the question of a unification of the telephone sector was not on the table through the 1950s. Nonetheless, it is an important context for understanding the balance of power between the Ministry of Public Works, the P&T, and the telephone companies. The companies, on the one hand, had an interest in demonstrating their competences and ability to run an efficient sector, while the P&T, on the other hand, had an interest in highlighting problems with the existing arrangement of the sector. As regards the concessions, three additional aspects must be highlighted. First, the concessions determined that the telephone companies were not allowed to raise prices in order to finance construction works. Such investments were therefore financed with loans. Second, it is moreover important to note that while the telephone companies enjoyed the exclusive right to deliver telephone services in the regions where they operated, this right was also accompanied with a duty to deliver such services – even when not profitable. The latter could for instance be the case with certain military installations, which were not used on a daily basis. Third, the concessions assigned a special priority to the telecommunication services needed for the state.[231] In the following years, these circumstances all contributed to discussions around how to organise civil-military cooperation on communications.

Despite the strained relations, a close and constructive cooperation on practical matters emerged between the P&T and the telephone companies in the late 1940s and early 1950s. This was not least caused by the technical development, which set the framework for a clearer division of responsibilities and placed the companies in a more submissive position vis-à-vis the state.[232] In 1945, the development activities, which had been put on hold during the occupation, were resumed, and the telephone companies obtained large loans in order to make extensions of both cables, exchange stations, and telephone devices.[233] An important development in this regard was the introduction of the carrier frequency technology allowing a much larger capacity of traffic to pass through the cables. Moreover, the automation of the exchange centrals, which had been projected and effected in some local areas before the war, was further

---

[230] Blüdnikow, *Post og Tele under samme tag*, p. 144f.; Jacobsen, *Jydsk Telefon*, p. 39; Blüdnikow, *Enhedsvæsenet*, p. 74f.

[231] For more on the duty to deliver tele services (in Danish referred to as 'forsyningspligten'), see Petersen, "Linien til Larsen på landet".

[232] Ibsen and Skovgaard Poulsen, "Path dependence and independent utility regulation", p. 55; Olsen, *Regulering af offentlige forsyningsvirksomheder i Danmark*, p. 275.

[233] During wartime, the companies had generated long waiting lists of future subscribers; by 1945, circa 41.000 orders for telephones awaited. Blüdnikow, *Enhedsvæsenet*, p. 71f.

implemented. Next in line was the exchanges for long-distance telephony, in which the introduction of semi-automatic expedition would enable telephone operators to directly connect a call to a receiver in most places of the country and also a few destinations abroad. These developments enabled the combination of short- and long-distance traffic and therefore called into question the previous division of responsibility between the P&T and the companies.[234] Accordingly, an agreement – referred to as 'the concordat' – was reached in 1950 that the companies should establish automated installations for telephone traffic meant for both inter-urban and long-distance telephony within their operating area, while the P&T established and maintained cables connecting the different regions and operated the main repeater stations.[235]

Military relations

Denmark's entry into the cooperation on the North Atlantic Treaty in 1949 led to three organisational changes in the area of telecommunications, paving the way for a close and regular cooperation between tele administrations and the defence authorities.

The first was the appointment in March 1950 by the then Ministry of War of a lieutenant colonel named P.O.H. Jessen to serve as a liaison officer the telephone services. The purpose of doing so was to let the liaison officer participate in meetings in the aforementioned Coordination Committee under the Telephone Control Board in which the officer should "represent the interests of the defence" in order to make sure that the future expanded telephone network would gain a dimension "that would satisfy the overall military demands."[236] The military need for a closer cooperation with the telephone sector emerged in a period in which the Danish Defence was profoundly reorganised as a consequence of the new alliance membership. This involved the introduction of a new military structure as well as a three-year programme for the build-up of forces, which implied a major increase in defence spending.[237] Despite initial scepticism from the tele administrations of

---

[234] Blüdnikow, *Post og Tele under samme tag*, pp. 66f., 131.
[235] Blüdnikow, *Enhedsvæsenet*, p. 84f. The designation of 'Konkordatet' was a reference to the historical conventions between the Papal State and sovereign states.
[236] I have shown previously how this appointment was done with inspiration from Norway, where the defence had engaged in similar relations with the tele sector: Jensen, *Klartone efter atombomben*, p. 39. For the appointment, see: Note from the 5th Office in the Ministry of War to the 4th Office, March 18 1950. FM 6. Kontor, Sagsakter 1950-1982, A097, 730-3/47.2. RA. Later in 1950, the Ministry of War and the Ministry of Naval Affairs was merged as part of the larger defence reorganisation, leading to the establishment of the Ministry of Defence. See Petersen, "Forsvarsministeriet", p. 274; Kaarsted, *De Danske Ministerier 1929-1953*, p. 428.
[237] This included the establishment of the position as a Chief of Defence, see Heurlin, "Forsvarskommandoen", p. 268f.; Petersen, "Forsvarspolitik", p. 276f. As for defence

including the liaison officer in their internal discussions, Jessen came to be a frequent participant at meetings in the Coordination Committee through the 1950s.[238] Thus, as many of the general, coordinating discussions on civil-military cooperation came to take place in this forum, the records of the meetings in the Coordination Committee are a good source for investigating the civil-military discussions around telecommunications.

The second change came in April 1952, when the Minister of Defence, Harald Petersen, established a special defence department to deal with communications called the Defence Telegraph Administration [Forsvarets Telegrafforvaltning, FTF] and appointed Jessen, now a colonel, as chief hereof. FTF was given the task of managing the coordination of "technical and economic planning and administration" of the Danish Defence's permanent telecommunications, as it was recognised that the "increased volume and importance" of telecommunications made more coordination necessary. Thereby, the division of responsibility between the defence and the tele administrations was formalised, as the circular calling for the establishment of FTF emphasised how the establishment, operation, and maintenance of telecommunication services for defence purposes was to be carried out by the civilian administrations "to the extent possible as compatible with considerations for the military preparedness". FTF's responsibility, then, was to make sure that the needed facilities were designed in the most technical and financial appropriate manner, that facilities were sought to be as standardised as possible, and that provisions were made for replacement and reserve material.[239] In this way, all requests for communications for defence purposes would now be forwarded through FTF as the central agency, but previous traditions in the tele sector were upheld, as the tele administrations would continue to be the primary suppliers of the requested communications services.

The third change was a decision taken by the government in November 1953 to set up an Inter-Ministerial Signal Committee [Den Interministerielle Signalkomité (IMSK)] with representatives appointed by the Minister of Defence and the Minister of Public Works. The director general of the P&T, KJ Jensen, served as chairman of IMSK, which was a consultative organ with the task of considering "all the important telecommunication questions for which a coordination of civil and military interests seems necessary", thereby

---

spending, the defence budget was tripled between 1949/50 and 1954/55. See Villaume, *Allieret med Forbehold*, p. 926.

[238] For the scepticism, see Jensen, *Klartone efter atombomben*, p. 39f.

[239] Announcement for the defence B.17-1952, FM, April 26 1952. 974A-1. EA. Importantly, the communication facilities for the air defence and the coast defence sites were not subject to the rule that they should be carried out by the civilian tele administrations. Instead, the construction, operation, and maintenance of these facilities was coordinated between the Defence Telegraph Administration and the military authorities in question.

ensuring that Danish telecommunication services "most effectively can meet the demands raised under war or extraordinary conditions."[240]

The establishment of FTF as well as IMSK must be understood as direct consequences of the NATO membership and the increased attention to telecommunications given within the alliance. As a result of both the 1951 establishment of the European Military Communications Coordination Committee (EMCCC) and the European Long Lines Agency (ELLA) and the 1952 extension of NATO's infrastructure programme to cover Denmark, the Danish defence was met with an increased demand for reporting on and coordinating national telecommunication matters with NATO agencies.[241] As touched upon in the previous chapters, NATO's conduct in the area of telecommunications relied on a close cooperation with national authorities on both military and civilian matters, and the EMCCC and ELLA directly stressed the need for national delegates who were able to represent both military and civil interests in telecommunications.[242] In Denmark, liaison officer Jessen was appointed to represent Denmark in ELLA and he therefore also represented Danish civilian telecom interests in NATO.[243] Once in a while, however, representatives from the telecom sector would also be drawn into the work in NATO's telecom agencies.[244] On a national level, the increased NATO collaboration raised a number of issues in which civilian and military interests collided, and which necessitated decision-making on a ministerial level, i.e. in IMSK.[245]

Thus, by late-1953, an organisational set-up had been worked out for how to deal with security aspects in the area of telecommunications, both on a practical and a political level. In the following section, I show how the FTF became an influential and agenda-setting actor in the Danish telecom sector through the 1950s. Before doing so, however, it is necessary to mention that it was not novel for the Danish telecom sector to engage in a close cooperation with 'security authorities' such as the Defence, the Foreign Ministry, the Ministry of Justice, and the intelligence services. Indeed, this had been a

---

[240] Note on the establishment of IMSK, FM, November 26 1953. 471A-1. EA.
[241] Minutes of CC meeting, January 14 1954. TM, TTS, Bilag til samarbejdsudvalgets møder; Review of FTF, April 22 1959. FM, Forsvarets Rationaliseringsudvalg, Kommissionspapirer 1953-1959, V013. RA.
[242] Memorandum from SG Liaison Officer, June 4 1953. Annex to C-M(53)77. NA.
[243] Note on the establishment of IMSK, FM, November 26 1953. 471A-1. EA.
[244] This was for instance the case in October 1953, when a representative for the companies and the PTT presented a report to ELLA on how the cooperation on civil-military communications was organised in Denmark. See: Paper read before the ELLA meeting, October 1953. TM, TTS, Enhedssagen 1945-1966. RA.
[245] Unfortunately, I have not been able to locate a file of records stemming from IMSK in neither the archives of the Ministry of Defence, under which IMSK was placed, nor the P&T, where the chairman was located. Instead, I have found IMSK documents in other case files in other archive groups.

common practice since the late nineteenth century, not least in times of crises. As previous research has shown, this relationship materialised in different measures as regards control of transnational communications, censorship, and surveillance. During the First and Second World War, for example, the tele administrations carried out important security-related tasks in terms of censorship for the Danish state, military authorities, or the occupying power.[246]

However, due to the NATO membership and the consequent build-up and internationalisation of the Danish defence, the cooperation between the telecom sector and military authorities assumed a new and more formalised shape, which reached beyond previous experiences. This reflected a general tendency related to the integration into NATO. By example, the aforementioned investigation of the Danish Security and Intelligence Service (Politiets Efterretningstjeneste, PET) during the Cold War revealed that the NATO membership and the cooperation on NATO intelligence issues caused the PET to systematise its work, for instance as regards the registration and security clearance of persons.[247] Moreover, similar kinds of civil-military cooperation on defence and preparedness issues as in the telecom area emerged in other societal sectors too, although this is still quite unexplored.[248] Moreover, we know from an examination of the Norwegian telecom sector carried out by the Norwegian business historian Harald Espeli how the sector was highly impacted by the NATO membership and the adaptation to Cold War circumstances. In Norway, an agency similar to the FTF, namely Forsvarets Fellessamband (FFSB), was established in 1953, also as a direct cause of the increased demands for military communications within NATO.[249] However, as I shall get back to later in this chapter, the civil-military cooperation on telecommunications in Norway took on a very different shape than what was the case in Denmark.

---

[246] See for instance Marklund, "Listening for the state"; Marklund "Trawling the Wires"; Nielsen, *Er der nogen på linjen?*. For the nineteenth century historical roots of this cooperation, see Marklund, "A Stake in Public Confidence"; Marklund "Suspekte beskeder".

[247] See Schmidt and Miller, *PET's virkemidler*, p. 76.

[248] An exception is the railway sector, which has been examined in a master's thesis by Asbjørn Rune Riis-Knudsen. Here, a liaison officer from the Army to the Danish State Railways [DSB] was appointed in 1955 with the purpose on ensuring a close coordination between the Defence and DSB on the planning for mobilisation and war, which also included much coordination with NATO agencies. See: Riis-Knudsen, *Totalforsvar på skinner*, part of which is also published in the 2014 article: Riis-Knudsen, "Totalforsvar på skinner".

[249] Espeli, *Det statsdominerte teleregimet*, p. 343.

3.2 Telecommunications for defence purposes

The primary task for civil-military cooperation on telecommunications in the early 1950s was to meet the increased demands for telecommunication facilities for defence purposes caused by the defence build-up in NATO and Denmark. This involved more than just constructing new facilities, it also raised some more fundamental questions, namely how international installations for defence communications were to be understood vis-à-vis the Danish state monopoly on communications and the division of responsibilities between the P&T and the telephone companies, and how they were to be balanced against existing civilian needs for construction works in the sector.

In order to examine how this problem was dealt with in the Danish sector, I shall now study four main issues which were raised in the civilian-military cooperation in the early 1950s. First, agreements had to be reached regarding what facilities that needed to be constructed and how – and by whom – this work should be carried out. The civilian telecom authorities were commissioned to carry out the construction work, but the Danish government furthermore decided that the military needs for new communication facilities should be sought combined with civilian needs. Second, because of this decision, the question arose of how the cost of the construction works and the use of the facilities should be allocated between military and civilian authorities. Third, I show how the participation in NATO's infrastructure programme introduced new 'infrastructural agendas' into Danish telecommunications, and, fourth, I look into the negotiations regarding the conditions for the daily peacetime use of the facilities.

Construction of military communications infrastructure

As described above, the P&T and the companies were projecting immense construction works in the late 1940s and early 1950s, of which the planned long-distance carrier frequency network formed a substantial part. The Minister of Public Works, Carl Petersen, was therefore aware already in late 1949 that the wishes for new communications circuits for military purposes would potentially pose a challenge.[250] In order to coordinate the civilian and military needs, the Telephone Control Board established a working group with the purpose of considering the military wishes for telephone and telegraph connections. In a November 1950 report, the working group summarised the communication needs reported by the different branches within the Danish defence in an overall plan. According to the information provided by the

[250] Petersen therefore informed his colleague, Minister of Defence Rasmus Hansen, that it was "very urgent" that the defence authorities notified the telephone sector about their needs for communications extensions so that they could be coordinated with civilian plans. Minutes of TTS meeting, April 27 1950. TM, TTS, Tilsynets Mødereferater. RA.

defence, this plan would "cover the defence's needs also during increased alert". The report concluded that since the civilian long line network was already "completely utilized", the plan could only be implemented gradually as the ongoing expansion of the carrier frequency network made progress. The working group also considered the army's special needs for links for operational purposes during a war. It found, however, that extending the network in such a way that the lines needed for the army's operation in wartime would be available at any time without reducing the civilian traffic "would be financially irresponsible", since very large sums would then be placed in telephone facilities, "which will perhaps never come into play."[251] It appears from the relevant material in the following period that this recommendation was met; in the negotiations between the defence and the tele administrations on extending the network for military purposes, facilities for operational aspects in wartime were not part of the equation.[252]

Following the submission of the report, the chairman of the Telephone Control Board, Steenbuch, informed the Ministry of Public Works that meeting the military needs would require extensive construction works. Steenbuch emphasised that in some cases, there was a reserve capacity in the planned long line cables that could be taken in use to meet military demands, although this would mean that there was no capacity left for the expected increase in civilian communications. In other cases, he noted, the telephone administrations would have to construct new cables that were not, at least for the time being, needed from a civilian point of view. Steenbuch concluded his address by stressing that these questions were "of far-reaching engineering and economic importance", for which reason he had found it necessary with political negotiations.[253]

The position of the government on this issue does not appear to have left behind many traces in the available archive materiel. Upon Steenbuch's request, the Ministry of Public Works hosted a meeting in April 1951 with participants from the ministry's own department along with delegates from the Ministry of Defence, the defence, as well as personnel from the tele administrations. The participants discussed the challenge of meeting the demands for defence communications in a situation where civilian needs were

---

[251] Report from the working group for the consideration of the defence's wishes for telephone and telegraph connections, November 23 1950. ITTS, NALLA Denmark, Emneordnede Sager 1950-1985, 1. RA.

[252] I shall therefore not go further into the question of operational military communications in this chapter. See for instance: Second report from the working group for the consideration of the defence's wishes for telephone and telegraph connections, December 1951. ITTS, NALLA Denmark, Emneordnede Sager 1950-1985, 1. RA.

[253] Note from Steenbuch to the Ministry of Public Works, December 2 1950. 974A-1-27, EA. See also Minutes of TTS meeting, February 1 1951. TM, TTS, Tilsynets Mødereferater. RA.

also pressing, but resources scarce. The minutes of the meeting give an insight into how the problem was approached, also politically. As I will outline below, the discussions reveal how both defence and security politics and general political priorities in relation to public telecommunications were in play.

At the meeting, liaison officer Jessen began by elaborating on the plans for extending communication facilities for defence purposes. He referred to plans for international long lines, which were planned to be financed under a common fund in NATO – i.e. a reference to the common infrastructure programme which at this point was being adopted by SHAPE. Moreover, he outlined the need for establishing new national lines operated by the defence and requested the tele administrations to inform him when planning to lay out long lines, so that defence authorities could expand their network as part hereof. Jessen stated that it was of high priority for the defence that communication facilities in Jutland were extended and he pointed towards the town of Kolding in Jutland as the future junction of national and international communications. Thereby, transiting Copenhagen and the Eastern parts of Denmark could be avoided.[254] In this manner, he referred to general considerations on Danish security in the early 1950s, as he specifically called attention to the possible scenario that the Danish islands, i.e. Eastern Denmark, were occupied in a future war.[255] In such a situation, Jessen stated, maintaining contacts between Paris and Oslo would be crucial. At this point, the build-up of the Danish Defence was still in an early stage and a defence of Denmark's territory in case of an enemy attack depended fully on receiving allied reinforcements.[256] For this reason, maintaining communications with Paris where SHAPE was located was paramount. The importance of communications with Oslo can be explained with the circumstance that Denmark served as a point of transit between Norway and NATO's Central European region and with a view to the close cooperation between Danish and Norwegian defence authorities constituting the northern flank of NATO.[257]

The military plans for extension of communication networks corresponded roughly with the civilian plans already drafted in the telecom sector. For instance, the P&T's post-war assessment was that if Denmark

---

[254] Minutes of meeting in MOA, April 25 1951. 974A-1-27. EA.
[255] As demonstrated in previous research, this was one of the threat scenarios that the Danish defence planned for. See Larsen, "Vejen til Danmarks sidste kystforter", p. 187.
[256] Villaume and Olesen, *I Blokopdelingens Tegn*, p. 162f. However, as Nikolaj Petersen, among others, has noted, allied reinforcements remained hypothetical until the early 1960s, Petersen, "Forsvarspolitik", p. 277.
[257] Denmark and Norway had since 1950 worked for the establishment of a special military command for the region, which later materialised with the establishment of the headquarters in Kolsås outside of Oslo of the Allied Forces Northern Europe (AFNE or AFNORTH), led by a Commander in chief, CINCNORTH. See: Villaume, *Allieret med Forbehold*, p. 213f.

should position itself as an important transit in international communications, new cables both north and south of Denmark were needed.[258] At this point, Denmark was linked with its southern neighbour Germany through submarine cables in the East and landlines in the West.[259] However, given the post-war chaotic situation in Germany, the P&T found a bypassing of both the Eastern and Western zones of occupation desirable from a practical and financial point of view. This was the primary reason for the P&T's most extensive post-war investment, namely a submarine cable between the Netherlands and Denmark, which began operation in September 1951.[260] As previously mentioned, the bypassing of German territory was also a key element in NATO's 1951 recommendations for communications infrastructure in the northern region.[261] However, the majority of the circuit capacity in the submarine cable to the Netherlands had already been reserved for commercial purposes when the military plans were discussed in the spring of 1951, and since further increases in traffic were expected, the P&T planned to keep in use the old cables through the Russian zone of Germany.[262]

Other studies have shown how the balancing of the defence build-up with other societal economic matters was a major political challenge in Denmark in these years. In the summer and fall of 1950, following the outbreak of the Korean War and the decision in September among the Atlantic Treaty countries to establish an integrated military command in Europe, Danish politicians and civil servants were concerned about the consequences the mobilisation would have for the "societal economic balance" in Danish society.[263] In particular, the balance of payments deficit posed a challenge, both

---

[258] The income from potential transit traffic was of great importance to the P&T. Given the political situation of post-war Europe, Sweden was increasingly interested in routing traffic through Denmark instead of using the Swedish submarine cables to Stralsund in Eastern Germany. Holmblad, "Koaksialkabelanlægget Danmark-Holland", p. 2.

[259] Prior to the Second World War, communications with the European continent had mainly happened through the Nykøbing-Rostock cable and the Kolding-Flensburg cable. Ibid., p. 1.

[260] The construction of the submarine cable was the largest engineering work that the Danish P&T had conducted at this point. The problem of communication through Germany was caused by the lack of a German authority with which the Danish P&T could collaborate and the fact that much of the capacity in German networks was occupied for military use due to the occupation of the German zones. Moreover, the risk of control and tapping of communications transiting Germany was accentuated in the political process prior to the approval of the submarine cable to the Netherlands. Ibid., p. 1ff.; Blüdnikow, *Post og Tele under samme tag*, p. 131.

[261] Note on the European Signal Infrastructure Program, June 1951. NA.

[262] Minutes of meeting in MOA, April 25 1951. 974A-1-27. EA.

[263] This phrase was used in a note prepared to the government by The Economic Secretariat [Det Økonomiske Sekretariat] in September 1950, outlining the financial challenges raised by the increased expenses for the military and the civil defence and Denmark's participation in the Atlantic Treaty. The note is quoted in: "Den centrale, generelle planlægning.", p. 5. IM, SCB, Sager vedr. det civile beredskab, 5. RA.

because the import of new material needed for the defence build-up required foreign capital and because global prices on raw materials generally increased after the outbreak of the Korean War. This caused the social democratic government led by Hans Hedtoft to begin studying adjustments of military investments to the general financial circumstances in Denmark.[264] Moreover, the liberal-conservative government led by Erik Eriksen that took over in late October 1950 imposed credit restraints and a suspension of civilian construction work in different societal sectors. This also affected the tele administrations who were asked to downscale their construction plans and found it increasingly difficult to be granted loans for new investments.[265] As the director of JTAS, Draminsky, noted at a meeting in the Telephone Control Board in February 1951, the "present unwillingness" of the credit institutions to borrow money to the company meant that JTAS would only be able to keep up the current pace until May, after which the company would have to give up the ongoing construction work. Draminsky emphasised how this would also have "an adverse impact on the national defence".[266]

Given this situation, the construction of new telecommunication facilities for military purposes raised a dilemma of a principal nature: How should the military needs for communications be prioritised vis-à-vis the needs for extending the underdeveloped public network? At the April 1951 meeting in the Ministry of Public Works, the ministry's permanent secretary, Palle Christensen, invited the meeting participants to consider how military and civilian interests could be coordinated. A colonel representing the Ministry of Defence stated that the Defence "was interested in the cheapest possible solution" according to which the defence authorities did not finance the construction work themselves. He intended to submit the case to the Minister of Defence "who would probably choose [the solution] that the telephone administrations constructed the installations by means of loans or funding and that the defence thereafter rented [circuits]". In reply, the chairman of the

---

[264] For this purpose, the government established the Committee for Defence Economy [Det Forsvarsøkonomiske Udvalg], which I shall get back to later. See: Villaume, *Allieret med Forbehold*, p. 298; Jensen, "NATO og danske økonomisk-politiske interesser 1949-56", p. 85; Jensen, "Det Forsvarsøkonomiske Udvalg", p. 280. In the Atlantic Treaty cooperation, Denmark also put forward the view that the military build-up was to be considered in the light of the strains put on the general financial situation in the member states. Documents related to this can i.a. be found in: ØM, Journalsager 1949-1959, 17, B23. RA.

[265] Jacobsen, *Jydsk Telefon*, pp. 59f., 87. The records of a special construction committee [Anlægsudvalget] give a further insight into the general reduction of construction works. See for instance: ØM, Journalsager 1949-1959, 7, B5, Anlægsudvalget. RA.

[266] Minutes of TTS meeting, February 1 1951. TM, TTS, Tilsynets Mødereferater. RA. The difficulty of obtaining loans was also addresses at meetings in the Coordination Committee: Minutes of SU meeting, February 22 1951 and January 10 1952. TM, TTS, Bilag til samarbejdsudvalgets møder. RA.

Telephone Control Board, Steenbuch, stressed that if the tele administrations constructed the needed military installations, the government would have to respect not to reduce the extent of civilian construction work at the expense hereof. Moreover, the tele administrations stressed that if they would have to reserve circuits for military use in the already planned cables, for example the submarine cable to the Netherlands, they would also miss out on important incomes they could otherwise have earned from commercial lease of the circuits.[267]

In reply, permanent secretary Palle Christensen informed the participants that the government's policy was that the military construction needs would have to take priority, "perhaps at the expense of civilian [needs]". He added, however, that "the standpoint would have to be, though, that we try to place the military construction programme on top of the civilian".[268] The latter comment made by Christensen can be understood as a proposal to let the construction needed for defence purposes follow the patterns of the already planned civilian programme, whereby military and civilian needs could be combined, for example with new cables containing circuits for both military and civilian use. When perceived through the lens of technopolitics, this statement can be understood as an attempt to further specific political priorities through technological possibilities. This interpretation is supported by a further comment made by Christensen that it would probably be easier for the P&T to obtain funding for new constructions if civilian and military needs were combined.[269] Given the lack of archive material on the governmental standpoint on the prioritisation between military and civilian needs for new communication facilities, the comments made by permanent secretary Christensen are noteworthy. It remains unclear to what extent Christensen's statements were directly derived from a political standpoint taken by the government and how much was his own translation hereof. Anyhow, the decision to combine military and civilian construction needs in common facilities was recalled on later occasions.[270]

It is noteworthy that no references to NATO were made in these negotiations. As outlined in chapter two, it was a central concern in NATO's infrastructure planning at this point that military communication needs should to the greatest possible extent be based on the existing civilian infrastructure. On a practical level, many of the circuits needed for defence purposes were established as so-called 'reserved circuits' [forberedte kredsløb], which were

[267] Minutes of meeting in MOA, April 25 1951. 974A-1-27. EA.
[268] Ibid.
[269] Ibid.
[270] For instance, the decision was explained in: Memorandum on the defence extension of the signal network, August 15 1956; Letter from the Ministry of Defence to the Finance Committee, July 25 1957. 974A-1-31. EA.

not established on a permanent basis, but could be coupled in and taken into use when needed. This was in line with the general practice in NATO. In a note sent to the Coordination Committee dated September 11 1951, liaison officer Jessen summarized how this arrangement had come about:

> "For designing the telecommunications network that has been planned for the use of the Atlantic Treaty defence and which includes international as well as national circuits, the proceeding has been that important parts of the network in peacetime shall remain as so-called reserved circuits."[271]

The reserved circuits could be made available for the military authorities at minimum 24 hours' notice, for instance by the declaration of alert. With this arrangement, more capacity was reserved in the network for civilian purposes in peacetime, but when the reserved circuits were coupled in, they would occupy parts of the civilian network. In a second report submitted in December 1951, the aforementioned working group considering the military wishes for telephone and telegraph connections recognised that from the point of view of the tele administrations, the projected decrease of civilian capacity in an emergency situation was undesirable. However, the solution with the reserved circuits was still favoured by the working group, which found that it at the time being would be "financially irresponsible" to establish the reserved circuits in a manner where they would not draw on the civilian network.[272]

In a similar vein, later notes recall how the decision to construct a large part of the needed military facilities as reserved circuits was a temporary solution decided upon by the telephone administrations with a view to the poor situation of the common network. The expectation was that when the network was adequately extended, the solution should be abandoned and the circuits established on a normal, permanent basis.[273] The arrangement with reserved circuits therefore serves as a case in point for how the telecom sector tried to balance military and civilian needs in the early 1950s and minimise the proportion of construction work needed for defence communications. In this way, the telecom sector adapted to the general economic situation by not scaling down their own construction programmes – and future income base – more than necessary. The arrangement with the reserved circuits later came to cause disputes in the sector – an aspect that I shall examine in chapter six.

---

[271] Note by the liaison officer to the CC, September 11 1951. TM, TTS, Rådighedskredsløb. RA.

[272] Second report from the working group for the consideration of the defence's wishes for telephone and telegraph connections, December 1951. ITTS, NALLA Denmark, Emneordnede Sager 1950-1985, 1. RA.

[273] Background note by SO on reserved circuits, August 24 1962. TTS, Rådighedskredsløb. RA; Note by KTAS on preparedness circuits, September 6 1967. Unfiled. EA.

By contrast, the solution in Norway was very different from the Danish one. As mentioned, an agency similar to the Danish Defence Telegraph Administration, namely Forsvarets Fellessamband (FFSB) [The Defence Communications Agency] was set up in Norway in 1953. While the establishment of FFSB was also caused by the NATO membership and the increased needs for military communications in Norway, it was also occasioned by a decision in Telegrafverket – the Norwegian equivalent to the P&T – not to participate in the establishment of a radio link network in Norway at the request of the Norwegian defence and with funding from NATO. As Harald Espeli has outlined, this decision was apparently rooted in a distrust by the director of Telegrafverket to the radio link technology, which was a relatively new invention at this point, but in the eyes of NATO the communication needs within the impassable Norwegian territory could best and most affordably be met with this technology. As a result, Norway ended up having two different communication networks, a civilian and a military, with almost the same capacity.[274]

Financing military construction works

In continuation of the Danish decision to establish common civil-military facilities to the extent possible, an outstanding issue remained to be settled, namely the financial aspects. At the turn of the years 1951-1952, two political decisions were reached as regards the funding of the construction work needed in order to meet military communication needs. The first involved providing the telephone companies with the opportunity to obtain loans from the so-called counterpart fund of the European Recovery Programme. The second was related to Denmark's participation in NATO's common infrastructure programme.

The counterpart fund was financial means that had been set aside in the Danish National Bank when receiving support from the European Recovery Programme (the Marshall Plan). In 1948, for instance, as part of the Marshall aid, the telephone companies were allocated a sum of 27 million kroner in foreign currency in order to import material for their construction work planned in 1949, on the condition that the companies raised a corresponding amount to be deposited in the National Bank.[275] The counterpart funds could only be spend on purposes on which the United States administration agreed, and beginning in the fall of 1951, in accordance with the American agenda of

[274] Espeli, *Det statsdominerte teleregimet*, p. 352. It is important to keep in mind in this regard that Norway served a different strategic purpose for the United States and NATO, not least in terms of SIGINT. See: Riste, "Cold War Intelligence in Scandinavia"; Aid, "In the Right Place at the Right Time". This raised other demands for Norwegian military communications.
[275] Jacobsen, *Jydsk Telefon*, p. 61.

promoting increased defence build-up in Western Europe, the United States began demanding the funds to be spend on defence purposes.[276] In this context, the Danish government decided in late 1951 to grant the telephone companies a 50 million kroner loan from the fund.[277]

I have dealt with this decision in a previous examination, in which I showed how the Danish government at the same time framed this loan as a civilian and a military investment.[278] When presented to the Parliament in January 1952, the Minister of Public Works, Victor Larsen, emphasised that the loan in question was a civilian investment, adding that "besides reducing waiting times on most stretches would also have a crucial importance for the defence".[279] As the Danish historian Leon Dalgas Jensen has shown, the Danish government favoured spending the counterpart funds on reducing national debts, but began changing its tactics in the fall of 1951 in response to increased US pressure.[280] Accordingly, the government endorsed civilian investments that directly or indirectly could also be framed as having military importance, and the telecommunications infrastructure appears to have served this purpose.[281] Shortly before the law proposal was drafted, the aforementioned working group established in 1950 in order to consider military communication needs had finished a new and updated report. Here, the committee stressed that a necessary precondition for the establishment of the defence installations in question was that certain stretches of the civilian carrier frequency network was extended as planned, since these stretches would also carry the planned defence communications.[282] Besides extending these stretches, the estimation was that the military construction work amounted to a cost of 26 million Danish

---

[276] The increased focus of canalising the American aid into defence investments was related to the passing of the Mutual Security Act October 1951. After this, the European Recovery Programme was superseded by a military aid programme, the Mutual Security Programme. See Jensen, "Marshallplanen", p. 423; Jensen, "Dansk forsvar og Marshallplanen 1947-1960", p. 465; Villaume and Olesen, *I Blokopdelingens Tegn*, p. 385.

[277] This was formulated in a law proposal in January 1952: Law proposal in RDT 1951-1952, A II, col. 3673.

[278] Jensen, *Klartone efter atombomben*, p. 41f.

[279] RDT 1951-52, FT Forhandlinger II, col. 1974.

[280] Jensen, "Dansk forsvar og Marshallplanen 1947-1960", p. 484. In total, almost 60% of the counterpart funds were used to write off debts, while 25% were used for investments in production facilities and infrastructure. From the fall of 1951 onwards, the Danish government began sharpening its position on American aid, which was increasingly perceive a challenge to the national room for manoeuvre.

[281] For practical reasons, I have not included the negotiations with the Americans on the counterpart funds in my examination. Such an approach would undoubtedly shed light on important aspects, but would require comprehensive studies in for instance the archives of the Ministry of Finance.

[282] Second report from the working group for the consideration of the defence's wishes for telephone and telegraph connections, December 1951. ITTS, NALLA Denmark, Emneordnede Sager 1950-1985, 1. RA.

kroner, and in the Telephone Control Board, the law proposal on the counterpart loan was presented as a means for covering this cost.[283]

The law was passed in late May 1952, after which the telephone companies themselves negotiated how the 50 million kroner should be allocated between them.[284] With this loan, the telephone companies received the necessary financial injection to begin constructing the facilities needed by the defence, but also to resume the construction of public communications installations, which had been put on hold due to the reduction of the construction plans imposed by the government with a view to the balance of payments.[285] For the government, investing in the telecommunications infrastructure was therefore a way of prioritising civilian aspects as part of the defence build-up that took place in the early 1950s. This must be understood as part of a general political priority in these years, where the defence mobilisation, as mentioned above, posed major challenges to the civilian economy. Previous research has shown how the three 'Atlantic Treaty parties' – the liberals, conservatives, and social democrats – generally agreed in this period that increased military spending had to be balanced with other societal investments.[286]

The second political decision related to the funding of construction of military communications facilities – which had to do with Denmark's participation in the third slice of NATO's common infrastructure programme – also demonstrates the political balancing between military and civilian

---

[283] Minutes of TTS meeting, December 6 1951. TM, TTS, Tilsynets Mødereferater. RA.

[284] At a meeting among the telephone directors in March 1952, they agreed that the 50 million kroner should be allocated so that KTAS received 27.5, JTAS 19 and FkT 3.5 million. Minutes of meeting in De Samvirkende Telefonselskaber, March 27 1952. Unfiled. EA. See also: Minutes of SU meetings March 27 and April 24 1952. TM, TTS, Bilag til samarbejdsudvalgets møder. RA; Minutes of TTS meeting, June 6 1952. TM, TTS, Tilsynets Mødereferater. RA.

[285] This decision had posed a great challenge for the sector. By example, the directors of the telephone companies discussed in October 1951 the proportions of the dismissal of personnel they would have to carry through. Minutes of meeting in De Samvirkende Telefonselskaber, November 1 1951. Unfiled. EA. In November, the Minister of Public Works received a visit from a delegation from two telephone factories which were at risk of closing down due to the decrease orders caused by the reduced construction plans. Minutes of TTS meeting, November 1 1951. TM, TTS, Tilsynets Mødereferater. RA.

[286] Through shifting governments, these three parties cooperated on alliance politics and thus formed a consensus standpoint the first decades of the Cold War. In the early 1950s, the Social Democratic Party in particular maintained that defence spending should be held at a reasonable level in order to invest in welfare as part of a broader security strategy. But whereas the two parties in power from 1950 to 1953, the liberal party Venstre and the Conservative Party were both more positive towards defence mobilisation, they also favoured keeping defence costs at a reasonable level. Petersen, "Forsvarspolitik", p. 276f.

demands.[287] As outlined in chapter two, the policy agreed upon in NATO was that the common infrastructure projects had to be of a common interest to more NATO nations. As for communications, this involved border-crossing links and domestic communications linking up to military facilities such as commands, airfields, and naval bases. By contrast, the nation states themselves were responsible for communications needed for national defence purposes within their own territory. The Danish defence communications installations constructed with the counterpart funds belonged in this latter category.

The financial aspects of Denmark's participation in NATO's infrastructure programme, including the allocation of costs and benefits hereof, was dealt with in the Committee for Defence Economy.[288] Following the February 1952 meeting of the North Atlantic Council in Lisbon, where the third slice of the common infrastructure programme was agreed upon, the Committee for Defence Economy approved a plan for the construction of communication infrastructure installations, primarily cable facilities, in Denmark at a total amount of 35 million Danish kroner. As the layout of NATO's programme prescribed, this amount would be partly funded by Denmark, and partly by common NATO funds.[289]

The Committee for Defence Economy decided that the Danish P&T and the telephone companies were to serve as advisors in the planning of the infrastructure projects and as contractors in the construction of the planned installations. Moreover, in line with the signal that had been given by the government in the spring of 1951, the committee encouraged the tele administrations to seek to combine military and civilian needs for communication circuits. When discussed at a meeting in the Coordination Committee of the Telephone Control Board in March 1952, the chairman underlined that many of the military cables to be constructed were planned in stretches where the tele administrations would probably themselves be interested in laying cables. Accordingly, he found it necessary "seriously to consider whether one should take the opportunity to also get the civilian needs in such stretches covered" – even if this would have the consequence that other

---

[287] For other aspects of the Danish part of NATO's infrastructure programme, see Villaume, *Allieret med Forbehold*, p. 411f.; Larsen, "Vejen til Danmarks sidste kystforter", p. 222f.

[288] The Committee for Defence Economy [Det Forsvarsøkonomiske Udvalg] was composed of representatives from different ministries and was headed by the permanent secretary of the Ministry of Defence. The work of the committee reflects how financial politics and defence and security politics were deeply intertwined in the early 1950s; the defence build-up had to be adjusted to economic circumstances and financial politics had to accommodate the challenges posed by the defence build-up. See Jensen, "Det Forsvarsøkonomiske Udvalg", p. 280f.

[289] Minutes of SU meeting, March 27 1952. TM, TTS, Bilag til samarbejdsudvalgets møder. RA.

planned construction works had to be postponed.[290] In order to support this, the Committee for Defence Economy recommended that "the economic benefit" of common installations should be given to the tele administrations in order to "encourage them to perform the work, if necessary at the expense of purely civilian facilities."[291] This meant, more specifically, that the defence budget would cover the majority of the cost of the construction work, whereby the tele administrations would only pay for the "additional expenditures" related to the extra work for strictly civilian purposes.[292]

NATO infrastructures

A closer examination of the communication projects that were part of the Danish share in the third slice can help illuminate how the participation in NATO's common infrastructure programme introduced new 'infrastructural agendas' into Danish communications.

The Danish communication projects in the third slice were a submarine cable between Hanstholm in Northern Jutland and Kristianssand in Southern Norway, a number of landline cables linking up to airfields (Thisted, Karup, Vandel, Skrydstrup, and Værløse) and other important military sites (e.g. Frederikshavn, Henriksholm, Gedser, and Kjeldsnor on Southern Langeland), and a radio link to Bornholm.[293] Some of these projects are depicted in figure 1, which shows a map of the extension of the Danish cable network under the signal infrastructure programme as of October 1953. The map was made by the Danish P&T in connection with a paper presented at a meeting in ELLA.

---

[290] Ibid.

[291] This recommendation was, according to a later note, agreed upon at a meeting in the committee in March 1952: Note from MOD on financial issues related to the defence telecom facilites, March 16 1955. ØM, Journalsager 1949-1959, 17, B23. RA.

[292] Memo written by P.O.H. Jessen, January 17 1955. 974A-1-31.EA.

[293] For a map showing these projects, see Annex B. More specifically, the following projects were listed as part of the third slice for Denmark in a 1952 report by the Working Party of Signals Experts under the Infrastructure Committee: Hanstholm-Kristiansand (submarine cable), Thisted-Esbjerg (quad cable), Aalborg-Thisted (quad cable), Herning-Karup (underground cable), Vejle-Vandel (quad cable), Haderslev-Skrydstrup (quad cable), Frederikshavn-Skagen (quad cable), København-Værløse (underground cable), København-Henriksholm (quad cable), Vordingborg-Skovhuse (quad cable), Nykøbing-Gedser (quad cable), Nakskov-Rudkøbing (quad cable), Rudkøbing-Kjeldsnor (quad cable), Odense-Beldringe (this project was postponed due to change in airfield plans), and Zealand-Bornholm (VHF link). See: Report by the Working Party of Signals Experts, August 30 1952, AC/4-D/93. NA.

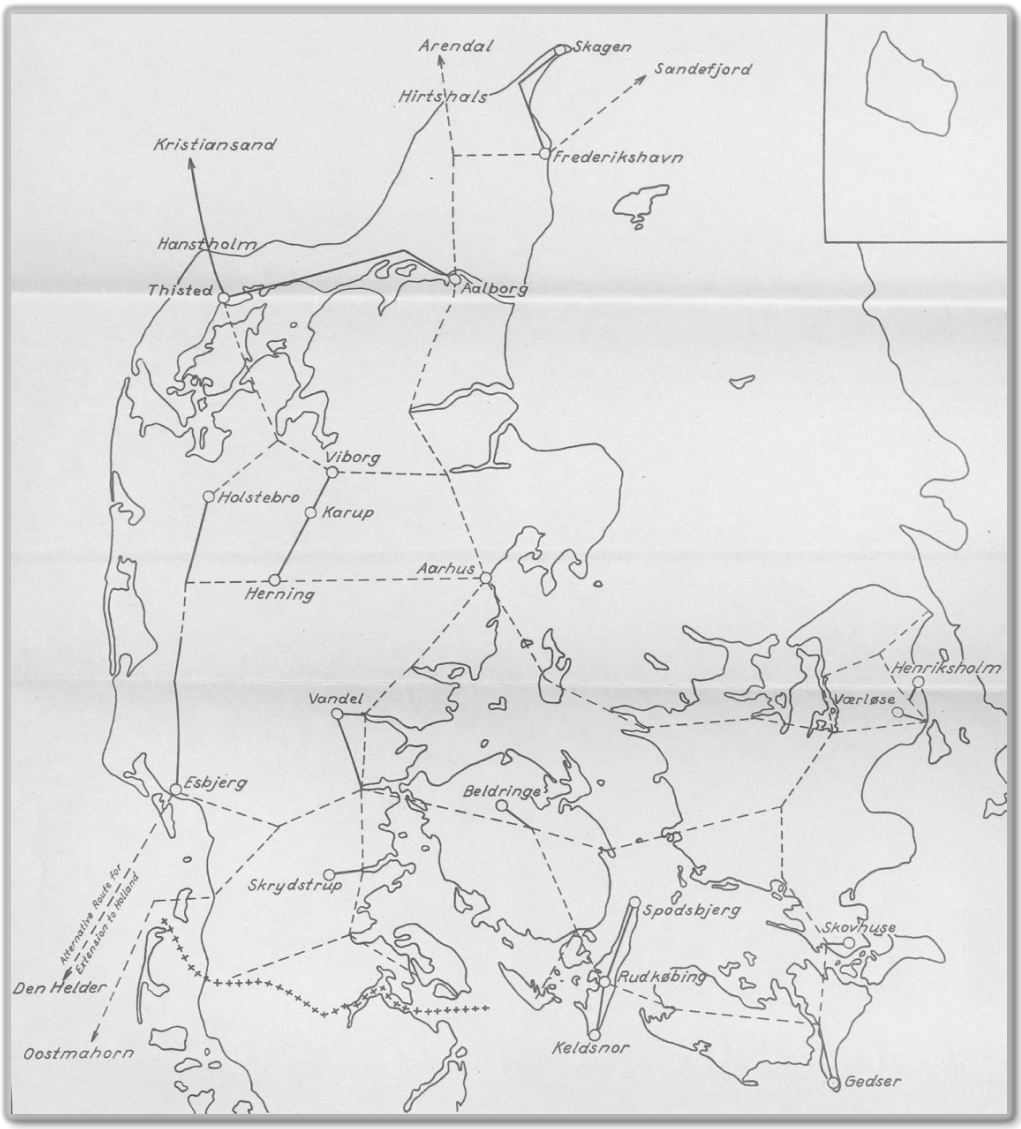

Figure 1. The extension of the cable network in Denmark as part of NATO's signal infrastructure programme as of October 1953. The dotted lines mark the public network and the bold lines show the military extensions.[294]

As mentioned in chapter two, NATO had established a group of signal experts given the task of examining all the proposed signal projects for the infrastructure programme. This group took in use the aforementioned '50% figure rule', which had been used for signal infrastructure planning in the Western Union Defence Organisation, stating that 50% of the existing or firmly

[294] Enclosure no. 9 to paper read before the ELLA meeting, October 1953. TM, TTS, Enhedssagen 1945-1966. RA.

planned civil telecommunication facilities was deemed to be available for military use in emergency.[295] NATO's working party of signal experts adopted the rule in the way that when reviewing the proposals for new facilities made by the member states, the construction of these facilities could be justified if the total military requirements on a route exceeded 50% of the then present facilities or new projects planned by the PTTs. As for the Hanstholm-Kristiansand cable, for example, NATO's signal experts estimated that the military use of the cable would only amount to 3% in times on peace. In case of a crisis, however, defence and security authorities would require 24% of the cable's capacity within 48 hours, additional 13% within 7 days and thereafter furthermore 26% and 34% - in other words, a possible military occupation of 100% of the cable's capacity could be expected in wartime.[296] In peacetime, however, the spare capacity could be used for civilian communications. In general, when reviewing the Danish proposals for the third slice, NATO's signal experts concluded that the proposed signal installations were all considered to belong to a category of projects "which add facilities to the existing civil network and will probably be used for civil purposes but which would not be undertaken by the PTTs except for the military necessity".[297]

The radio link to the island of Bornholm in the Baltic Sea serves as a case in point in this regard. At this point, most telephone traffic between Bornholm and the rest of Denmark were routed via Sweden.[298] From a civilian point of view, this was the most favourable solution, but it was less fortunate from a military point of view, since Sweden was neutral in the Cold War. In a forthcoming article, the Danish-Swedish historian Andreas Marklund shows how the connections to Bornholm had also posed a challenge during the Second World War. Since all communications across borders were perceived as a potential security threat, both by the P&T before the German occupation of Denmark and later by the occupation power, daily communications between Bornholm and the rest of Denmark were subject to mass surveillance.[299] In the post-war years, the general public traffic to and from Bornholm increased, causing the P&T and KTAS – the company who operated the local traffic on the island from 1946 – to discuss the future circuit requirements. Increased

---

[295] Note on the European Signal Infrastructure Program, June 1951. NA.
[296] Report by the Working Party of Signals Experts, August 30 1952, AC/4-D/93. NA.
[297] However, the Zealand-Bornholm link also belonged in the category "Projects which add to the available circuits in the civil network and which can be agreed from the outset to have a specific amount of civil and national military interest of 50% or more". See: Report by the Working Party of Signals Experts, August 30 1952, AC/4-D/93. NA.
[298] A submarine cable was established between Ystad in Sweden and Rønne on Bornholm in 1931 containing ten telephone circuits. Prior to this, telephony to and from Bornholm was made through a radiotelephony link that opened in 1923. Nielsen, "Kabler og forstærkerstationer", p. 286; Bramslev, "Radiotelegrafi og radiofoni", p. 370.
[299] Marklund "Trawling the Wires".

demands could be met either by extending the links via Sweden, including constructing a new submarine cable between Ystad in Sweden and Rønne on Bornholm, or by constructing a direct link between Eastern Denmark and Bornholm.[300] It is difficult to conclude to what extent the construction of a direct radio link as part of the common infrastructure programme affected the civilian considerations, but it did at least stress the advantages of bypassing Sweden. Upon this, the P&T decided to construct a direct submarine cable from the Copenhagen area to Bornholm, which opened in 1960. In 1967, this was followed up by a submarine cable from Nykøbing on the island of Falster to Bornholm.[301]

The construction of a submarine cable between Hanstholm in Northern Jutland and Kristiansand in Southern Norway serves as another example of how military and civilian agendas in communications infrastructures correlated. The submarine cable was of great importance to NATO, since it provided a direct link within NATO's Northern European Region, and, moreover, through the Denmark-Netherlands cable linked up the north with the Central European Region, thereby by-passing Germany and neutral Sweden. At this point, Denmark and Norway were already linked with two submarine cables established during the Second World War (Hirtshals-Arendal and Frederikshavn-Sandefjord), but the capacity in these was insufficient, for which reason much traffic transited Sweden.[302] Thus, a further cable to Norway was also desirable from a civilian point of view – and the Danish P&T already had plans on the drawing board for the construction of an additional cable. Military authorities, by contrast, wished to place the cable "along more westerly routes than desirable for civilian purposes".[303] While the P&T wished for the Hirtshals-Arendal to become the main route of telephone traffic from Norway

[300] These plans are outlined in the aforementioned 1953 presentation given at an ELLA meeting by the P&T and the telephone companies. The title of the presented paper was "The organization of telecommunication in Denmark, particularly with a view to the military telecommunication services". See Paper read before the ELLA meeting, October 1953. TM, TTS, Enhedssagen 1945-1966. RA.

[301] Nielsen, "Kabler og forstærkerstationer", p. 288f.

[302] The Hirtshals-Arendal and Frederikshavn-Sandefjord cables were established by the German occupation army during the Second World War and after the war taken over by the P&T. The Frederikshavn-Sandefjord cable was an old coil loaded cable, which had formerly been used in the Baltic Sea, between East Prussia and the rest of Germany in order to evade the Polish corridor. The removal of the cable caused many defects, for which reason more than half of the circuits in the cable were by 1953 out of use. See: Paper read before the ELLA meeting, October 1953. TM, TTS, Enhedssagen 1945-1966. RA. For a general overview of Danish international cables in the early 1950s, see Holmblad, "Koaksialkabelanlægget Danmark-Holland", p. 2.

[303] Paper read before the ELLA meeting, October 1953. TM, TTS, Enhedssagen 1945-1966. RA.

to Denmark and onwards to Western Europe, military authorities favoured the Hanstholm-Kristiansand route. [304]

The military concerns about the physical location of the submarine cable reflects a historical challenge which has been related to the construction of submarine cables since the mid-nineteenth century. As historians of communications have shown, the location of submarine cables at the sea floor and their landing sites have posed great challenges for states and private businesses.[305] Moreover, in the world wars of the twentieth century, the location of global submarine cables turned out to be pivotal, since the cutting of enemy cables became a commonly used weapon.[306] From a reliability point of view, the two existing cables between Denmark and Norway had demonstrated the challenges related to submarine cables. The two cables had been laid by the German Army during the occupation of Denmark. As they were established in wartime for military purposes, they were effectuated differently than what would probably have been desired for civilian requirements in peacetime. The Frederikshavn-Sandefjord cable was an old coil loaded cable, which had formerly been used by Germany in the Baltic Sea, more specifically between East Prussia and the rest of Germany in order to evade the Polish corridor. When the cable during the Second World War was relocated to the Skagerak in the North Sea, the removal caused many defects on the cable, for which reason more than half of the circuits in the cable were by 1953 out of use. The Hirtshals-Arendal cable was a new coaxial cable, but due to its location it was much exposed to damage by fishing vessels.[307]

In addition to this, however, the military considerations for a Danish-Norwegian submarine cable also seem to have been part of a broader infrastructural strategy. In Jutland, long-distance communications were routed via the carrier frequency network. This network was concentrated along an eastern route with Aalborg-Aarhus-Kolding as the backbone, and the Hirtshals and Frederikshavn cables to Norway were linked up with this long-line network.[308] However, the military authorities found it desirable to establish their

---

[304] Moreover, the cable was much exposed to damage by fishing vessels, and this is probably why the military authorities favoured another route. See: Paper read before the ELLA meeting, October 1953. TM, TTS, Enhedssagen 1945-1966. RA.

[305] The struggles for establishing the first transatlantic telegraph in the 1850s and 1860s serves as a case in point. See for instance Headrick, *The Invisible Weapon*, p. 17f.; Winseck and Pike, *Communication and Empire*, p. 16f. As for cable landing sites, Simone Müller has shown how both technical and diplomatic concerns were at stake when planning cable landings. See Müller, *Wiring the World*.

[306] See for instance Headrick, *The Invisible Weapon*, pp. 138f, 243f.; Bruton, "The Cable Wars".

[307] Paper read before the ELLA meeting, October 1953. TM, TTS, Enhedssagen 1945-1966. RA.

[308] At this point, the carrier frequency network in Jutland ran from Hjørring in Northern Jutland via Aalborg, Randers (with a western link to Viborg and then north to Thisted or

circuits along a more western route in Jutland. This was due to the fact that large military sites such as the airfield in Karup was located in Western Jutland.[309] This was a sparcely populated area, where civilian requirements for communications were low. As part of NATO's infrastructure programme, a supplementary military extension was therefore made of the civilian cable network in Western Jutland, through which traffic in the Hanstholm cable could be routed to Esbjerg, from where military authorities planned to build an addition to the Netherlands cable, which would also follow a more western route than the existing stretch.[310] In this way, the long-distance network in Jutland was supplemented with a western backbone of which much was sponsored by NATO and the Danish defence. In peacetime, this link also constituted a civilian extension. For instance, the cable between Viborg and Karup contained 150 circuits, of which 100 were used by defence authorities and 50 by JTAS.[311] The military need for communications thus resulted in construction of infrastructure stretches that would probably not have been prioritised at this point from a civilian point of view, since traffic requirements were generally low in this area. Besides this, the military extension also introduced more flexibility into the network by following another route than the one favoured by the civilian administrations, i.e. the cheaper option.

Thus, since the technopolitical visions behind the military communication plans were different from those drafted by the civilian tele administrations, the participation in the third slice of the infrastructure programme introduced new infrastructural agendas into Danish telecommunications. Examples similar to the ones related to the third slice can be found when looking into later infrastructure projects.[312] Prior to this, the military communications planning had relied more on the construction plans worked out by the administrations. As recalled, in the spring of 1951 liaison officer Jessen had asked the tele administrations to inform him about their

---

south to Holstebro), Aarhus (with a western link via Silkeborg and Herning to Skjern), Kolding (with a western link to Esbjerg and an eastern link to Odense and Copenhagen), to Aabenraa in Southern Jutland. See: Enclosure 7 to Paper read before the ELLA meeting, October 1953. TM, TTS, Enhedssagen 1945-1966. RA.

[309] For more on Karup as an important Danish Cold War site, Stenak et al. eds., *Kold Krig*, p. 55.

[310] The western 'backbone' included military extensions from Hanstholm to Thisted and from Holstebro to Esbjerg. Moreover, via NATO infrastructure cables, the military airfield of Karup was linked up with Viborg and Herning, from where traffic could be routed in the civilian network. As for the Netherlands link, military authorities favoured the longer and more expensive route from Esbjerg to Den Helder over the existing Rømø-Oostmahorn. See: Enclosure 9 to Paper read before the ELLA meeting, October 1953. TM, TTS, Enhedssagen 1945-1966. RA.

[311] Minutes of meeting in MOA, October 10 1952. 974A-1-27. EA.

[312] By example, the existing voice frequency telegraph system was widely extended as part of the infrastructure programme, as this technology suited military purposes. See: Paper read before the ELLA meeting, October 1953. TM, TTS, Enhedssagen 1945-1966. RA.

cable plans so that the military authorities could join in on these. The participation in NATO's infrastructure programme created a momentum for military initiatives in communications planning. To a certain extent, the initiative shifted, as the tele administrations were now given the choice of deciding whether they wanted to join in on the military plans. This also meant, however, that the tele administrations would have to prioritise differently than what they had planned for, if they wanted to have civilian circuits in the cables planned to be established for military purposes. JTAS director Draminsky addressed this problem at the aforementioned meeting in March 1952. Draminsky stated that he had "long feared this situation", since the companies would now be forced to set aside other projects for the sake of defence works, which could very likely delay the ordinary activities of the companies to such an extent that it would be loss-making.[313] However, while it may be reasonably supposed that some of the Danish installations would probably not have been prioritised as highly at this point if it were not for the military interest, it is a more difficult task to find out which other projected installations were given a lower priority due to the military agenda.

A special kind of customer?

Following the political decisions to provide a loan from the counterpart fund and include a number of communication projects in the Danish part of NATO's infrastructure programme, the tele administrations set in motion the comprehensive construction work needed in order to fulfil the needs for military communications for both NATO and the Danish defence. This was, as evident from above, a new kind of task, which also raised new issues as regards the conditions for use of the facilities.

The construction work can be divided into two categories: Work which was financed by the tele administrations, e.g. with funding provided through the counterpart loans, and work for which capital had been raised by defence authorities, whether partly or totally, e.g. the installations part of NATO's infrastructure programme. This created different circumstances as for agreements on rental costs, ownership rights etc., and the matter was further complicated by the status of the telephone companies as concession granted businesses.

From the outset, the defence authorities had insisted on the need for a favourable arrangement in terms of the rent they should pay for using the civilian-owned facilities. They argued, on the one hand, that they were now such a large customer that they were entitled to a "wholesale discount", and maintained, on the other hand, that "[p]rivate shareholders should not make

[313] Minutes of SU meeting, March 27 1952. TM, TTS, Bilag til samarbejdsudvalgets møder. RA.

money on defence build-up".[314] Upon request, the legal department of the Ministry of Public Works began examining to which extent the telephone companies according to the concessions were obliged to execute work needed by the defence at specified terms. The ministry concluded in the autumn of 1952 that this was not the case: The issue of payment between the administrations and the defence was not a matter regulated by the concessions, and the ministry did therefore not have the authority to determine the prices. Accordingly, the matter had to be dealt with per se between the administrations and the defence without political involvement. The Ministry of Public Works however encouraged the parties to negotiate a common solution on the payment issue in order to have common standards all over the country.[315]

A settling of the payment issue however proved very difficult. The representatives from the defence and the tele administrations formed a working group for the purpose, and as a passing remark, it is quite telling of the atmosphere in the group that a collection of the letters sent back and forward among the members has ironically been nicknamed "love letters".[316] Eventually – upon four years of negotiation and the involvement of more ministries – an agreement was reached in the autumn of 1956 and finally approved by different instances during the fall of 1957.[317] When the chairman of the working group, JTAS director Draminsky, in 1957 looked back at the negotiations, he commemorated how the difficulties had revolved around

> "working out formulations that both the defence, which had to pay regard to demands from NATO, and the telephone companies, which had to take financial aspects into account

[314] Minutes of meetings in MOA, April 25 1951 and October 10 1952. 974A-1-27. EA.
[315] Letter from the MOA the TTS, September 30 1952; Minutes of meeting in MOA, October 10 1952. 974A-1-27. EA; Minutes of SU meeting, September 30 1952. TM, TTS, Bilag til samarbejdsudvalgets møder. RA.
[316] The working group was established upon a meeting in the Coordination Committee in late October 1952. It was later refered to as the 'Draminsky committee' since the JTAS director Paul Draminsky served as chairman in the group. See: Minutes of SU meeting, October 30 1952. TM, TTS, Bilag til samarbejdsudvalgets møder. RA. The letters have been filed in a dossier by the former telephone liaison engineer to the defence sector, whose successor inherited the dossier and later submitted it to the Enigma Archives. See: 974A-1-28. EA. In general, the dispute has left behind many traces in all the involved actor's archives.
[317] As an illustration of how the problem had gained complexity, approval of the final agreement was, besides the tele administrations and FTF, also needed from the Ministry of Public Works, the Ministry of Defence, the Ministry of Finance, and the finance committee of the Danish parliament. See: Memorandum on the defence extension of the signal network, August 15 1956 and Letter from FTF to SU chairman, October 15 1957. 974A-1-31. EA.

and make allowances for their regular subscribers, could agree to."[318]

Draminsky's remark point towards an important technopolitical basis for understanding the conflict, namely that the scope of action was in the end defined by the NATO membership, on the one hand, and by the technological and organisational layout of telecommunications, on the other hand.

As for the rent issue, the final agreement reached between the tele administrations and the defence stated that work carried out for the defence authorities should follow the regular "Terms and tariffs" that applied to all the work that the companies conducted.[319] In his way, the Defence Telegraph Administration was not – as it had argued heavily in favour of from the outset – treated as a special kind of customer. In the negotiations, the tele administrations repeatedly stressed that their concerns were not a matter of making profits but of having their expenses covered, so that their ordinary subscribers would not be met with the bill.[320] The operating costs of the NATO-financed installations were a national concern, and there existed no common standards for this in NATO to begin with.[321] Later, in 1955, the Danish Ministry of Defence notified Draminsky's working group that a decision of principle had been reached in NATO of dividing the costs for the use of common facilities proportionally according to the number of civilian and military circuits. The ministry stressed that the current Danish tariffs proposal would "cause trouble with NATO", but it appears that the ministry stood alone on this position.[322] The FTF eventually found it acceptable to agree to the regular terms and tariff "in order to have the defence's facilities managed in the best way".[323]

In return, the defence authorities succeeded in having a reference to the 'societal duty' of the telephone companies inscribed into the final agreement. In the preamble, the agreement stated that it had as its object to manage telecommunication facilities "in the manner most advantageous for society".[324] This was a reference to a discussion that had been carried on in the working

---

[318] Commented summary regarding the settlement between the FTF and the tele administrations, February 14 1957. 974A-1-27. EA.
[319] Agreement between FTF and the tele administrations, signed September 20 1957. 974A-1-31; Report regarding the settlement between the FTF and the tele administrations, November 27 1956. 974A-1-31. EA.
[320] JTAS' comments on colonel P.O.H. Jessen's memo of January 17 1955, April 5 1956. 974A-1-31. EA.
[321] Minutes of meeting in the Ministry of Public Works, October 10 1952. 974A-1-27; Memo written by P.O.H. Jessen, January 17 1955. 974A-1-31. EA.
[322] Note from MOD on financial problems regarding telecommunications, March 16 1955. ØM, Journalsager 1949-1959, 17, B23. RA.
[323] Minutes of SU meeting, December 7 1956. TM, TTS, Bilag til samarbejdsudvalgets møder. RA.
[324] Agreement between FTF and the tele administrations, signed September 20 1957. 974A-1-31. EA.

group, where the defence representatives had called for the telephone companies to prioritise military needs and begin incorporating military communications request into their long-term planning. In doing so, they referred to the a aforementioned obligation stemming from the concessions to deliver telecom services in the area in which the companies operated – 'forsyningspligten' as it was called in Danish. The companies stressed that this duty referred to situations "where society [was] arranged in the normal way", but since the defence increasingly "established itself in areas and in a concentration that differ[ed] from the societal normal", telecom services in these areas should be regarded as "special demands".[325] With the agreement, however, the companies accepted that although the regular terms and tariffs also applied to the defence, defence authorities were to be regarded as a special kind of customer with special privileges.

Another and related issue at stake was the question of ownership of the facilities. As described previously, the new facilities could in peacetime be used for civilian communications, but in the event of war, the capacity would gradually be confiscated for military purposes. As a result hereof, the question of ownership was tricky, and no agreements on ownership issues had been reached prior to the beginning of the construction.[326] The viewpoint of the tele representatives was that they, on the one hand, wished to be able to predispose the entire communication networks within their area. On the other hand, however, they were not interested in owning facilities that did not correspond with commercial demands.[327] The Ministry of Defence stressed that the defence was compelled to "express outwardly that the facilities paid for by the infrastructure programme belonged to the defence".[328] This was a reference to NATO standards, but when the working group asked the Ministry of Defence to look into the matter, the ministry found the NATO regulations to be quite vaguely defined.[329] The matter was moreover complicated by the status of the telephone companies as private businesses, but a memorandum prepared for the working group in August 1956 concluded that since the state owned the majority of the stock in the companies, company-owned facilities could still be regarded as state property.[330] In the end, therefore, the agreement was reached

---

[325] JTAS' comments on colonel P.O.H. Jessen's memo of January 17 1955, April 5 1956. 974A-1-31. EA.
[326] This was caused by the fact that FTF was eager to see the work begin. See: Memorandum on the defence extension of the signal network, August 15 1956. 974A-1-31. EA.
[327] Memo written by P.O.H. Jessen, January 17 1955. 974A-1-31. EA.
[328] Minutes of meeting in MOA, October 10 1952. 974A-1-27. EA.
[329] Note from MOD on financial problems regarding telecommunications, March 16 1955. ØM, Journalsager 1949-1959, 17, B23. RA.
[330] Memorandum on the defence extension of the signal network, August 15 1956. 974A-1-31. EA.

that the telecommunication installations paid for by NATO's infrastructure programme or by the Danish defence over time should be handed over to either the P&T or one of the telephone companies.[331] In hindsight, this was an agreement with far-reaching influence, since it laid down the principle that facilities constructed by the defence would not remain a military asset but over time be integrated into the remaining civilian communications infrastructure.[332]

Still, despite the agreement reached in 1956 that the work carried out for the Defence Telegraph Administration should follow the regular terms and tariffs of the companies, the Defence Telegraph Administration was by no means a regular customer or subscriber. This circumstance was for instance addressed at a meeting between tele representatives and the FTF in July 1958, which according to the minutes had been arranged in order to find common ground upon the long-standing financial dispute between the two parts. At the meeting, the two parties agreed that many aspects of the tele administration's collaboration with the FTF "differs substantially from ordinary subscription conditions and obligations", not least because "Denmark's membership of NATO and this organisation's shares in a number of the tasks that are assigned to the telephone companies have to be taken into consideration."[333]

The increased provision of military communications services and the collaboration with both the FTF and NATO also introduced new dimensions into the telecom work in other ways. For instance, the new tasks were accompanied with new working procedures and new considerations for security and secrecy. This was also stressed at the July 1958 meeting, from whose minutes the following passage appears: "The secret and confidential character of the tasks make demands on the handling of correspondence, issuing of orders, and other matters related to internal security."[334]

In terms of secrecy, the Defence Telegraph Administration and the tele administrations had made agreement regarding disclosure measures for information related to the defence installations in 1952.[335] In a note sent to all the departments in KTAS in June 1954, the recently appointed director Christen Steenbuch strongly emphasised how the security measures which had been agreed upon between the FTF and the tele administrations had to be strictly observed. This meant, by example, that the bills sent to defence

---

[331] Agreement between FTF and the tele administrations, signed September 20 1957. 974A-1-31. EA.

[332] This is for instance stressed in a 1989 report describing the development in the organisation of the communications preparedness in Denmark. See: Report by the ad hoc working group on liberalisation of the tele sector, October 4 1989. 974A-1-2. EA.

[333] Minutes of meeting in FTF, July 11 1958. 974A-1-31. EA.

[334] Ibid.

[335] The agreement, discussed at a meeting in the Coordination Committee in November 1952 implied that the FTF would be in charge of classifying documents etc. Minutes of SU meeting, November 27 1952. TM, TTS, Bilag til samarbejdsudvalgets møder. RA.

authorities could not contain information about the specific circuits in question, but only refer to an identification number that each circuit had been given.[336] New security standards also applied to the technical operators. In 1955, for instance, a case was discussed in the Coordination Committee related to an incident where installation workers from KTAS had refused to comply with a military demand to carry identification when visiting military sites.[337] This is an example of increased focus towards 'inner security' in all NATO member states in the mid-1950s, leading to requests for measures on a national level in the shape of access control and background surveys of personnel.[338] As evident, this spilled over into an increased focus on daily security standards in the civil-military cooperation on telecommunications. In chapter five and six, I shall further explore how the cooperation with defence authorities in Denmark and NATO introduced a new security agenda for the P&T and the telephone companies.

3.3 Renegotiating the civil-military division of work

As evident from the first sections of this chapter, the increased cooperation with defence authorities brought along by the NATO membership and the defence build-up affected Danish telecommunications planning during the 1950s. By the end of the decade, many of the challenges and disputes that arose in this civil-military cooperation had been settled. At this point, however, the civil-military cooperation on communications and division of responsibility worked out through the 1950s was transformed. This was the result of two political decisions. The first was a decision to close down the Defence Telegraph Administration (FTF) that had played an important role in shaping civil-military communications since its establishment in 1952. The closure was part of a larger exercise of rationalising the Danish defence, but it was enabled – as I shall demonstrate – by the fact that many of the tasks conducted by the FTF could essentially be handled by the tele administrations. A second decision followed from this, namely the transfer of a number of security responsibilities to the tele sector. In this section, I examine the background of these organisational changes in the sector.

---

336 Note from the KTAS direction to different sections, June 5 1954. Unfiled. EA.
337 Minutes of meeting in De Samvirkende Telefonselskaber, April 28 1955. Unfiled. EA.
338 In Denmark, the Danish Security and Intelligence Services (PET) initiated a process of registering personnel with access 'key points' regarded to be a potential threat in case of a crisis. For more, see: Laursen, *Politiets Efterretningstjeneste 1945-1968*, p. 140ff., 172ff.; Schmidt, *PET's Overvågning af Arbejdsmarkedet 1945-1989*, p. 99f. For NATO's request to prioritise this issue, see for instance Report by the Committee on Civil Organization in Time of War, January 4 1955, C-M(55)4. NA.

The closure of the Defence Telegraph Administration

The Ministry of Defence took the decision to close down the Defence Telegraph Administration in 1961. This was done on the basis of a recommendation made by a rationalisation committee in 1959 and became effective as of July 1962.

The background for the 'rationalisation' of the defence reached back to 1953, when the new social democratic Minister of Defence, Rasmus Hansen, shortly upon taking office in the fall of 1953 established the Committee for Defence Rationalisation [Forsvarets Rationaliseringsudvalg].[339] Following a period in which the defence expenditures had increased a great deal on a yearly basis, the political desire for lowering the defence costs was occasioned by more factors. This includes the circumstance that the new social-democratic government relied on the support of a more defence critical party, the Radical Left, and the arrival of a period of lower tensions in the Cold War conflict after the March 1953 death of Stalin and the July 1953 armistice in the Korean War.[340] In the following years, the Committee for Defence Rationalisation carried out reviews of the administration of the Danish Defence Staff in order to identify possible decreases in personnel.

In June 1957, the Ministry of Defence – in which Poul Hansen now served as minister – asked the rationalisation committee to conduct a review of the organisation of the Defence Telegraph Administration and consider whether some of the tasks performed by FTF could be transferred to other military or civilian agencies.[341] Since its establishment in 1952, FTF had grown rapidly. In terms of numbers of employees, for instance, it grew from eight people in 1952 to 132 employees in 1955, thereupon falling to 113 by 1957/1958.[342] One of the initiators of the rationalisation process later explained that the impression was that "FTF had swollen up far too much".[343]

In reviewing possibilities for rationalising FTF, the rationalisation committee also called into question whether it was even necessary to maintain

---

339 The social democratic government led by Hans Hedtoft replaced the liberal-conservative government led by Erik Eriksen in late September 1953. The committee was established after an American expert on rationalisation had recommended to carry through a number of rationalisation initiatives in the Danish defence. It held its first meeting in late October 1953. See: Minutes of meeting no. 1 October 22 1953, October 24 1953. FM, Forsvarets Rationaliseringsudvalg, Kommissionspapirer 1953-1959, V013. RA.

340 Villaume, *Allieret med Forbehold*, p. 355; , Ringsmose, "Paying for Protection", p. 80f.; Kaarsted, *De Danske Ministerier 1953-1972*, pp. 21, 34f.

341 Letter from FM to the Committee for Defence Rationalisation, June 27 1957. TM, TTS, Forsvarets Rationaliseringsudvalg 1956-1961. RA.

342 Review of FTF, April 22 1959. FM, Forsvarets Rationaliseringsudvalg, Kommissionspapirer 1953-1959, V013. RA.

343 Minutes of TTS meeting, September 3 1959. TM, TTS, Tilsynets Mødereferater. RA.

FTF as an independent organisation. Considering this question, the commission revisited the arguments that had been put forward by the time FTF was established. Here, considerations for the NATO cooperation had played a vital role, but the committee observed that it would not pose a problem if the tele administrations themselves were in direct contact with military commands, national as well as international. Perhaps, it was argued, this would even be more suitable, since the tele administrations were best suited for evaluating appropriate technical solutions and cost estimations.[344] Another argument that had been put forward when FTF was established was that of technical standardisation. The rationalisation committee noted, however, that the defence in effect did not even have an influence on the selection of technical devices, since the FTF was compelled to follow the technical directions proposed by the tele administrations.[345]

This comment by the rationalisation committee reflects the development that the Danish telecom sector had undergone through the 1950s. In the negotiations around the concessions in the late 1940s, it had been used as an argument against the divided structure of the Danish telephone sector that it suffered from a low level of technical standardisation, and it was with this purpose in mind that the Coordination Committee was set up in 1948.[346] By the late 1950s, upon major advances in automation and extensions of the long-distance carrier frequency network, the sector appeared much more standardised. This also applied to defence communications installations, for which many very detailed matters were coordinated at meetings in the Coordination Committee. By example, a 1957 review by a working group established by the Coordination Committee on the possibilities for 'error recoveries' in the different parts of the Danish telecommunications network in case of destruction pointed out that it should be avoided that the defence chose technical solutions which were not compatible with those of the tele administrations, since this caused a need for further technical special knowledge and more reserved materiel.[347]

The rationalisation committee concluded in April 1959 that given the close cooperation among the four civilian tele administrations and the technical expertise they possessed, the P&T and the telephone companies could be assigned the matter of coordinating the construction of communication installations for defence purposes. Recommending this, the rationalisation

---

[344] Minutes of meeting March 6 1958; Review of FTF, April 22 1959. FM, Forsvarets Rationaliseringsudvalg, Kommissionspapirer 1953-1959, V013; Draft summary of the reasons behind the establishment of FTF, February 1 1958. TTS, Forsvarets Rationaliseringsudvalg 1956-1961. RA.

[345] Ibid.

[346] Blüdnikow, *Enhedsvæsenet*, p. 78f.

[347] Report from the committee on error recovery, May 1957. ITTS, NALLA Denmark, Emneordnede Sager 1950-1985, 1. RA.

committee emphasised that the need for maintaining a separate department for telecommunication activities within the defence would decrease in the future and that the monopoly on delivering permanent telecommunications through the public network in Denmark had the consequence that the competences of FTF were limited anyway.[348]

The position of the telecom sector on this matter must also be taken into consideration. The P&T was first asked about their opinion of whether it would be possible to place the FTF as a special military section within the P&T in 1957, but refrained from a standpoint before the Ministry of Defence had considered the matter and reached a conclusion.[349] In 1959, when the P&T and the Telephone Control Board was drawn into the matter again, the General Directorate of the P&T wrote a memorandum outlining its "concerns" about closing down the FTF.[350] When discussed at a meeting in the Telephone Control Board in September 1959, the director general KJ Jensen elaborated how the P&T was not interested in taking over a lot of work from the defence. Moreover, he made a reference to the Swedish telephone sector, in which the equivalent to the P&T, Televerket, had taken over the responsibility for tasks related to military telephony. Jensen outlined, however, that the Swedish case was very different, since Sweden had a unitary telephone system and was not a NATO member and therefore not in the same way as Denmark subject to international commitments and engaged in the planning of international exercises. JTAS director Draminsky echoed this concern and stressed that the work load in the future would not be smaller just because it was transferred to the tele administrations.[351]

Against this background, the Ministry of Defence decided in the beginning of 1961 to go forward with the idea of a potential closure of the FTF – despite concerns from the tele sector. The ministry established a committee in order to examine the future organisation of military communications.[352] This committee submitted a report in November 1961 suggesting that some of the coordinating tasks within the defence that FTF had been in charge of were transferred to the Chief of Defence, while other tasks were handed over to a new office within the P&T.[353] A circumstance likely to have influenced this

---

348 Review of FTF, April 22 1959. FM, Forsvarets Rationaliseringsudvalg, Kommissionspapirer 1953-1959, V013. RA.
349 Ibid.
350 Minutes of TTS meeting, September 3 1959. TM, TTS, Tilsynets Mødereferater. RA.
351 Ibid.
352 Minutes of TTS meeting, March 2 1961. TM, TTS, Tilsynets Mødereferater. RA. The committee had representatives from the Ministry of Public Works, the P&T, the Ministry of Defence, the Defence, and the Defence Telegraph Administration.
353 Report from the committee for reorganisation of the defence telecommunications service, November 9 1961. TM, TTS, Udvalget til Reorganisering af Forsvarets Telekommunikationstjeneste 1956-1961; Minutes of SU meeting, November 30 1961.

decision was that at this point, the FTF Chief colonel Jessen retired. With the closure of the Defence Telegraph Administration, the tele sector gained new tasks and thereby entered a new role in terms of security governance. The new office in the P&T responsible for managing communication circuits for defence purposes was operational as of March 1962. I shall demonstrate in chapter five how this new role also increasingly came to involve the responsibility for wartime planning in the area of communications.

On a different note, March 1962 was also the date by which the existing concessions granted to the telephone companies in the late 1940s would automatically be extended for another five years, if the Ministry of Public Works had not given notice of their termination by February 1961. Accordingly, the debate about how the Danish telecom sector was organised was resumed in the late 1950s and early 1960s.[354] This caused FTF Chief Jessen in July 1960 to circulate a memorandum in which he proposed a number of changes to the concessions in order to spell out the obligations in terms of defence and preparedness communication tasks that applied to the telephone companies. This is noteworthy, since the question had been raised on different occasions through the 1950s, for instance in the negotiations on the payment agreement as outlined above. In Jessen's proposal, he referred to the arrangement agreed on within NATO that extra circuits for defence purposes were to be prepared in peacetime and established by the outbreak of a crisis or war. Jessen outlined how the participation of the telephone companies in this process relied on the premise that the companies "were under a duty to satisfy the state's estimated [communication] needs". In the concessions, however, this duty was only vaguely defined and it was in the eyes of Jessen not accompanied with a necessary authority, for instance the authority to limit other subscribers from making calls in the network.[355]

Jessen's appeal appears to have gained a hearing in the Ministry of Public Works. At least, when the concessions were extended for another five years in the summer of 1961, one of the few changes made was the adding of a passage giving the ministry the authority to order the companies to take different measures in order to secure and maintain essential telecommunications.[356] At this point, the political focus on preparedness issues in different sectors had generally increased since the Parliament in December 1959 had adopted a law on civil emergency planning. I shall explore this further in chapter five and six.

TM, TTS, Bilag til samarbejdsudvalgets møder; Minutes of TTS meeting, December 7 1961. TM, TTS, Tilsynets Mødereferater. RA.

[354] Blüdnikow, *Enhedsvæsenet*, p. 95.

[355] Note on the concessions of the telephone companies. JTAS, Journalsager 1896-1988, 210. RA.

[356] Notification from MOA about §3 of JTAS concession, June 28 1961. TTS, Diverse. RA. For the observation that only very few changes were made to the existing concessions, see: Johansen, *Fra monopol til konkurrence*, p. 80.

For now, the 1961 concessions serves as an example of how the Cold War adaptation that had taken place in the Danish telecom sector through the 1950s materialised in different ways and provided the sector with new tasks essential for the Danish state.

The 1961 concessions came into being as part of a first step to transform of the sector significantly. In September 1960, the Minister of Public Works, Kai Lindberg, had establish a committee in order to examine the future organisational structure of the sector. The committee came back with two different recommendations, which caused the minister to establish a large commission to carry through a thorough examination of the sector with a particular focus on the prospect of gathering all the telecommunication services in one joint company of which the state owned the majority. It was in this context that the government decided to extent the concessions in order to give the commission time to work.[357] Moreover, the minister decided in April 1962 to reorganise the Coordination Committee and change its purpose into working more directly towards a unitary service.[358] However, the work in the telephone commission resulted in a number of disputes, and the report of the commission was never published and its recommendations never carried through – mainly as a result of obstruction by the telephone companies. Instead, the work of the commission came to a halt in the late 1960s after which the telephone companies' concessions were extended once again and the telephone commission finally dissolved in 1971.[359] This 'stalemate' in the negotiations on public-private balances in the Danish telephone sector meant that the civil-military cooperation established through the 1950s and modified with the 1962 closure of the Defence Telegraph Administration continued in the shadow of many public debates on the future arrangement in the sector.

Concluding remarks

The aim of this chapter has been to examine how defence and security issues influenced the Danish telecom sector in the 1950s. The limited focus on this decade has allowed me to explore in detail from both a political, organisational, and technological point of view how the NATO membership and the new defence political circumstances affected the area of communications. Against

---

[357] Blüdnikow, *Enhedsvæsenet*, p. 97. With this change, *Samarbejdsudvalget* was renamed *Samordningsudvalget*. The two terms are similar and translate into coordination in English, but 'samordning' points slightly more towards harmonisation.
[358] Ibid., p. 97. With this change, *Samarbejdsudvalget* was renamed *Samordningsudvalget*. The two terms are similar and translate into coordination in English, but 'samordning' points slightly more towards harmonisation.
[359] The progress in the telephone commission has been studied in detail by Bent Blüdnikow: ibid., p. 95ff.. See also Johansen, *Fra monopol til konkurrence*, p. 79f.

this background, I argue that the 1950s must be understood as a decade of Cold War adaptation for the Danish telecom sector.

In response to the NATO membership, the military need for increased communications provided the tele administrations with new tasks in terms of constructing communication facilities in order to provide sufficient facilities for both international and national defence purposes. The dimension of the construction work for defence communication facilities was larger than for any other subscriber, for which reason the Danish defence became the largest individual customer of telecom services.[360] This meant, on the one hand, that military authorities entered the scene as a new kind of stakeholder engaged in defining internal developments in the sector. This translated into new working procedures etc., but also in the introduction of new infrastructural agendas in the shape of the NATO infrastructure projects. On the other hand, it also meant that the tele administrations began thinking military communications into their long-term planning. This was a result of the political decision to try to seek civilian and military needs combined – reaffirmed in the 1957 agreement made between FTF and the tele administrations. It is important to note how this, from a technological-economic point of view, was rendered possible by the circumstance that the construction of new communication facilities for the defence coincided with the major extensions of the civilian telecommunications network across Denmark taking place in the 1950s, including the transition to carrier frequency technique, which increased the capacity in the long line links.

In this way, the Danish telecom sector gained political importance in a new way, which was moreover confirmed with the decision in the early 1960s to close down the Defence Telegraph Administration and transfer many of the tasks hereof to the P&T. The existing literature studying the Danish communications sector in the 1950s has shown how the sector by the end of decade was profoundly different from what it had been in the early post-war years. However, while these examinations have focused on inner-sector organisational and technological aspects, this chapter has demonstrated how the 'Cold War adaptation' is also an important key to understanding developments in the sector through the 1950s. This was not least due to the attempts of in particular the Ministry of Public Works to further a technopolitical agenda in which the new defence political circumstances were seen as an opportunity to also extend and develop civilian communications. In this way, the chapter also presents a new perspective to existing historiography on the political and military project of Denmark's integration into NATO. Besides involving major changes in the military sector and a number of political

[360] This point was stressed at a 1958 meeting: Minutes of meeting in FTF, July 11 1958. 974A-1-31. EA.

dilemmas as regards the balancing of alliance concerns with other security political concerns and wider societal economic concerns, this integration also brought along new tasks – and opportunities – to the communications sector.

[4]

Networked and nuclear allies

The technopolitics of telecommunications system-building in NATO, 1950s-1980s

> "While Napoleon's dictum that an army marches on its stomach is still a true measure of the importance of Logistics – to use its modern name – in modern warfare, the importance of signals communications in maintaining command at all levels has never been greater than it is today."[361] (Brigadier Cole, SHAPE, 1956)

In December 1954 NATO "went nuclear".[362] As the alliance adopted a new strategy which emphasised the immediate use of nuclear weapons in a future war, it began preparing for a nuclear war in both offensive and defensive manners. This exerted new demands upon the speed, reliability, and survivability of the alliance's communication facilities. Thus, while telecommunications and the integration of national systems, as demonstrated in chapter two, was a key component in the rearming of Western Europe in NATO's early years, telecommunications were now ascribed new technopolitical purposes.

This chapter examines how telecommunications systems in the alliance developed in interaction with political developments from the 1950s through to the 1980s. Research into NATO cooperation in other areas of science and technology has shown how such projects also served the purpose of creating allied unity, providing legitimacy for NATO's political project, or furthering American 'soft power' ambitions.[363] Likewise, research on infrastructure and technological system-building has documented how such undertakings have been used to push political integration forward or to legitimise a particular

---

[361] Cole, "Signal communications in NATO", p. 61. The 1956 article by Eric Cole, a British Brigadier at SHAPE, figured in a journal published by the Royal Netherlands Association "Our Army". Cole's affiliation appears from: NATO C-E Board meeting minutes, April 15 1955. SGM-226-55. NA.

[362] Trachtenberg, "The Nuclearization of NATO and U.S.-West European Relations", p. 413.

[363] See for instance Krige, *Sharing knowledge, Shaping Europe*; Krige, "NATO and the Strengthening of Western Science"; Krige, *American Hegemony*; Turchetti, "Sword, Shield and Buoys"; Turchetti, *Greening the Alliance*; Risso, *Propaganda and intelligence in the Cold War*.

political project.[364] NATO's conduct in the area of telecommunications infrastructure and governance, however, is a largely unexplored field. This calls for an examination of how NATO's telecommunications infrastructure developed in the interaction with political, military, and technological agendas – or, as captured with the concept of 'technopolitics', how communications infrastructure was designed or used strategically to enact specific political goals.

Through the lens of technopolitics, this chapter traces the development of communications system-building in NATO, thereby following up on the first years of networking the alliance that I examined in chapter two. In doing so, I pay particular attention to the role of the 'system-builders', understood as different kinds of agents pushing for the construction and development of sociotechnical systems by using the power they possess, e.g. from controlling technological knowledge.[365]

Thereby, I argue that the period can be divided into three overlapping phases in which political and technological agendas have interacted in different ways. The first phase is characterised by an increased attention to the vulnerability of existing communication systems caused by the new nuclear agenda introduced in 1954. The second phase is distinguished by two American initiatives to introduce communication alternatives in the form of new and highly modern systems in the mid-late 1950s and 1960s. I argue that this must be understood as efforts to pursue a specific technopolitical agenda, marking a break from the infrastructural agenda of the early 1950s that was, as outlined in chapter two, based on the use of civilian communications networks. Finally, a third phase is marked by a shift occurring in the late 1960s, where telecommunications began to be perceived as an important tool in crisis management and thereby a prerequisite for pursuing the strategy of 'flexible response' adopted by the allies at this point. Overall, by examining these three phases of technopolitics in the area of telecommunications, the chapter demonstrates how the telecommunications security agenda in NATO was continuously renegotiated in an interplay with different technopolitical dynamics.

4.1 Nuclear war and communications security

In this section, I explore how the 1954 adoption of the nuclear strategy marked a turning point for the alliance adding a new dimension, namely that of nuclear vulnerability, to the communications system-building that had taken place since

[364] See for instance Badenoch and Fickers, "Europe Materializing?"; Misa and Schot, "Introduction: Inventing Europe"; Marklund and Rüdiger, "Historicizing Infrastructure", Trischler and Weinberger, "Engineering Europe".
[365] Hecht and Edwards, "The Technopolitics of the Cold War", p. 274.

the early 1950s.[366] The new strategy was formally embraced when the North Atlantic Council on December 20 1954 approved the document MC 48 "as a basis for defence planning and preparations by the NATO military authorities". MC 48, entitled "The Most Effective Pattern of NATO Military Strength for the Next Few Years", emphasised the immediate use of nuclear weapons for the defence of Europe in a future war: "Should war occur, the best defense against atomic attack lies in the ability of the Allied nations to reduce the threat at source by immediate and intensive atomic counter-attack."[367]

The fact that MC 48 was adopted for both offensive and defensive planning meant that the framework for the defence preparations previously carried out in NATO, both collectively and individually in the member states, changed considerably. As an example of how the nuclear agenda influenced the perception and management of telecommunications in NATO and the member states, the following section outlines how NATO's civil emergency planning agencies called attention to how existing communication facilities, also those for strictly civilian uses, needed to be better protected.

The planning for a defence of the civil population and the home front, including attempts to secure the communications infrastructure, had been a topic of NATO concern for some years prior to the nuclearisation. This was rooted in the expectation that a future war would play out on two fronts, namely the military and the home front.[368] With the North Atlantic Treaty, the member states had committed themselves to "separately and jointly, by means of continuous and effective self-help and mutual aid, maintain and develop their individual and collective capacity to resist armed attack."[369] The initiative to prepare for the civil society's organisation in times of war initially came from Lord Ismay, who was elected as the alliance's first Secretary General in March 1952.[370] In his attempts to raise awareness to civil preparedness, Ismay

---

366 I have examined this in previous studies too, but given my aim in this dissertation to reach an understanding of the security governance that emerged out of this process, it is necessary in this section to outline the civil emergency planning in NATO prior to and in response to the nuclearisation, See: Jensen, "Connecting the Alliance", p. 202f.; Jensen, *Klartone efter atombomben*, p. 18f., 27f.

367 Final Communique, December 20 1954. C-M(54)123. NA. MC 48 was approved by the Military Committee in late November 1954,s see: Report by the Military Committee, November 22 1954. MC 48(Final). NA. The strategy was in line with the concept of 'massive retaliation'. As Trachtenberg has noted, what was special about the MC 48 strategy was not that it relied on nuclear forces, but that it built on the assumption that there was one, and only one, way in which the Soviets could be prevented from overrunning Europe in the event of war, namely through the very rapid and massive use of nuclear weapons, both tactically and strategically. Trachtenberg, *A Constructed Peace*, p. 158.

368 van Heuven, "Civil Emergency Planning in NATO".

369 "The North Atlantic Treaty", April 4 1949, article 3. NA-E.

370 The decision to establish such a position was taken at the aforementioned Lisbon meeting in February 1952. Ismay, *NATO. The First Five years*, p. 48.

emphasised that modern war was "a trial of strength and willpower" between nations and that, therefore, "[n]either the valour of our soldiers nor the excellence of their equipment can be of any avail if the home front cracks."[371] Ismay's address reflected the general concern for 'fifth column' activity and referred to experiences hereof in the Second World War, stressing that the danger of Soviet efforts in this area were immeasurably greater.[372] As a result of Ismay's efforts, a number of committees were established to work on different aspects of civil emergency planning.[373] In the area of communications, these efforts led to the appointment of vital telecommunication installations as 'key points' which national governments were obliged to protect. These points were regarded as being of particular importance to a country's war effort and to a country's participation in the NATO war effort, and therefore also thought to be possible targets of enemy action, more precisely sabotage carried out by fifth columnists.[374]

With the adoption of the new nuclear assumptions as a basis for war planning, the previous efforts to secure the communications infrastructure were deemed inadequate. Ismay found that when linking the task of civil preparedness with the MC 48 strategy, "entirely new aspects [had] to be considered".[375] In January1955, he proposed to the North Atlantic Council that the committees working on civil emergency planning should base their preparations on the assumption that the enemy "from the outset of hostilities" would launch nuclear attacks. Ismay listed a number of general locations which – besides allied atomic production and delivery capabilities – could be regarded as priority targets for the enemy. This included allied centres of government, industrial and communication centres, the major port complexes, and centres of population, and Ismay stressed how the destruction of such sites "would be likely to have the most serious effects on the war effort and particularly on

---

[371] Address by Ismay to the Council, June 5 1952. C-M(52)27. NA.
[372] For more on the fifth column initiatives initiated by Ismay's address, see Laursen, *Politiets Efterretningstjeneste 1945-1968*, p. 138.
[373] In June 1952, the Council established the Working Group on Civil Organization in Time of War and before the end of 1952, further nine new committees working on civil emergency planning had been set up, in particular on issues related to supplies and logistics. These committees stressed the need for a higher degree of coordination between the member states, for instance as regards standardisation, interchangeability of equipment, and the development of common plans for communications. See: Interim report on civil organisation in time of war, July 4 1952. C-M(52)49. NA; Progress report on civil organisation in time of war, November 10 1952. C-M(52)101. NA; Report by Ismay to ministerial meeting of the NAC in Bonn, May 1957. NA.
[374] Report by the Committee on Civil Organization in Time of War, January 4 1955. C-M(55)4. NA.
[375] General survey of civil emergency planning structure, December 21, 1955. AC/98-D/1. NA.

civilian morale."[376] Ismay's proposal was adopted by the Council in May 1955, and the members agreed that in order to mitigate effects of attacks on the appointed targets, it was essential to take a number of preparatory measures in use already in peacetime. These measures should be based on the assumption that the first thirty days of a war would be the most critical period, possibly with the heaviest attacks concentrated in the first three or four days. As the paper approved by the Council emphasised, the "ability to defeat the enemy is dependent on ability to survive and gain superiority in the initial phase [of a war]".[377] Thus, the shift towards nuclear planning brought along an increased focus on preparedness planning for the very early phases of a future war, i.e. the mobilisation phase.

Moreover, while civil emergency planning had largely been perceived as a national responsibility in NATO's first years, the nuclear agenda paved the way for a prioritisation and centralisation of the area of civil emergency planning. For this purpose, the Council agreed to set up a Senior Civil Emergency Planning Committee (SCEPC) in November 1955.[378] The Council "attach[ed] the highest importance to the development of such planning in NATO countries" which was exemplified with the fact that each nation should be represented at the highest possible level and that the Secretary General would serve as chairman of the senior committee.[379]

Communication was one of the issues that caught the attention of the new senior committee. In December 1955, the committee considered a note by Ismay on possible gaps in NATO's emergency planning, according to whom:

> "It is evident that the need for communications in time of an emergency has been increased by the adoption of the new assumptions and it seems likely that such activities as civil defence and transport will have important requirements for communications."[380]

The committee thereupon agreed to make a review of the planning activities in the field of communications. In April 1956, the secretary of SCEPC noted that "there is no simple or quick solution to the problems involved", but that,

---

[376] Note on further assumptions for civil emergency planning, January 19 1955. C-M(55)8. NA.
[377] Note on the application of the new assumptions, May 27 1955. C-M(55)48(Final). NA.
[378] The decision was based on an American proposal calling for a reorganisation of the civil emergency planning structure with a view to the many committees set up in the beginning of the 1950s and a growing need of coordinating matters in between all of these committees. Note on US proposal, August 20 1955. C-M(55)75. NA.
[379] Note in the establishment of SCEPC, November 10 1955. C-M(55)100. NA.
[380] Note on possible gaps in NATO emergency planning, December 30 1955. AC/98-D/7. NA.

broadly speaking, "the problem of communications facilities required can be divided into those for which nations are individually responsible within their own borders, and those required for international purposes and which cross national boundaries." The latter group was perceived as a NATO responsibility and involved for instance international transmission of warnings of air attack or fallout and communication requirements for NATO's civilian wartime agencies such as a planning group for transport in wartime.[381]

Although the member states themselves were responsible for securing communication infrastructures within their own borders, SCEPC began to make examinations of national problems in this area and pass on a large number of recommendations and directives to the member states. The concern for national communications was first raised in an examination in March 1956 on the challenges of maintaining governmental control in the first phases of a future war. The examination found that a main problem in this regard was to maintain communications between the government, the central administrative services, and regional and local authorities, and it therefore called for the establishment of communications systems between the wartime seats of these branches of government.[382]

In continuation hereof, SCEPC also began addressing problems of national public communications in wartime in a broader sense. A temporary working group established under SCEPC with the specific purpose of handling the wartime communication requirements of NATO's civilian wartime agencies concluded in October 1956 that a further problem necessary to address was that of "the necessity of maintaining national communications in a thermonuclear war". The working group recalled how the Senior Civil Emergency Planning Committee for general emergency planning had worked out a report pointing towards a number of potential national targets in case of nuclear or thermonuclear attacks in a future war. Among these were industrial and urban areas, and as the communications working group noted, these areas were in most cases also vital communication centres. The working group estimated that if these areas "are rendered 'virtually useless', the national communications systems may be seriously hampered". This would not only have consequences for the maintenance of governmental control in a national territory, but also for inter-governmental and international communications.

---

[381] Note on communications problem, April 13 1956. AC/98-D/20. NA. NATO's civilian wartime agencies was for instance the Planning Board for European Inland Surface Transport (PBEIST) responsible for wartime utilization of all inland civil and military transport in Europe. In order to ensure that such agencies in wartime would be located areas with sufficient communications, SCEPC initiated a collaboration with ELLA and a number of national PTTs with the purpose of avoiding "communications desserts", see: Note on international wartime communications requirements, October 22 1956. AC/98-D/28. NA.

[382] Note on maintenance of governmental control, March 29 1956. AC/98-D/16. NA.

The working group therefore stressed the need for national PTTs to "review their plans in order to minimise the damage likely to occur due to the concentration of main terminations in probable target areas".[383]

The potential national targets that the working group referred to require a further comment. In order to provide "a uniform basis" for civil emergency planning, the Senior Civil Emergency Planning Committee issued a comprehensive document in May 1956, stressing that the planning for the opening phase of a war should be directed towards ensuring the survival of the populations and the maintenance of governmental and other controls.[384] The document listed a number of cities and areas in Europe as expected targets, and in doing so, it ushered in a new agenda in the alliance's telecommunications system-building. In the early years of networking outlined in chapter two, more of the communications infrastructure projects were constructed between cities, since this was also where commands etc. were placed. The pointing out of urban areas as potential targets can, by contrast, be understood as a new security standard which the member states were asked to base their national telecommunications planning upon. I shall go further into the outfall hereof in a national context in chapter five.

Moreover, in order to follow the progress in the member states more closely, the SCEPC decided in January 1957 to introduce an annual review of the progress in the different areas of civil emergency planning.[385] When this decision was approved at a meeting in the North Atlantic Council in March 1957, the chairman of the council also noted that it had been "one of the wisest" decisions taken to establish SCEPC, "since the Committee had succeeded in bringing order into an area in which there had been considerable confusion in the past". Moreover, the chairman stressed that "it was now up to Governments to implement the plans recommended by the Committee".[386] The introduction of the annual review gave cause to a closer and more standardised monitoring of each member state's progress in the different areas of civil emergency planning. In the area of communications, SCEPC decided to establish a permanent Civil Communications Planning Committee (CCPC) in January 1957 in response to the request made by the communications working group in October 1956. As one of its areas of responsibilities, the CCPC should "study overall requirements for communications required in time of war for civil purposes" and make recommendations for how gaps in communications

---

[383] Note on international wartime communications requirements, October 22 1956. AC/98-D/28. NA.
[384] Note on assumptions for civil emergency planning, May 2 1956. AC/98-D/14(Final). NA.
[385] Summary record of meeting in SCEPC, January 28 1957. AC/98-R/3. NA; Questionnaire for the 1957 Annual Progress Review, April 11 1957. AC/121-D/5. NA.
[386] Summary record of meeting in the Council, March 8 1957. C-R(57)15. NA.

requirements in wartime could be closed.[387] This meant that NATO now had both a civilian communications committee and a military communications agency, namely the European Long Lines Agency (ELLA) established in 1951. Both agencies referred to the European Military Communications Coordination Committee.

Thus, with SCEPC and CCPC, a new kind of security governance emerged in the area of communications, operating in the cross field between the international NATO-level and the national level and between military and civilian fields of telecommunications. The establishment of SCEPC and CCPC meant that the member states were now presented with a framework upon which they could base their national planning. For instance, a report presented to the North Atlantic Council by SCEPC in March 1957 stressed that "Nations should ensure, so far as possible, that a communications network is available to meet the needs of the survival period, which must include all available methods."[388] The work carried out among the national delegations in SCEPC and CCPC came to provide the basis for a standardised and uniform planning of civil emergency issues in the area of telecommunications, a framework upon which the national planning could be based.

In practice however, NATO's civil emergency planning agencies did not have authority to do more than make recommendations and criticise when member states did not follow suit. In the end, civil emergency planning was a governmental responsibility, and – compared with the authority of military commands – the direct influence of NATO's Secretary General on national policies was of a more limited character. This reflected the general power balance in NATO in these years where – to borrow a phrase from Lawrence Kaplan – "power seemed vested in the supreme commander", for which reason military issues carried a heavier weight in NATO's cooperation than other fields of a more political character.[389] However, it appears that the Secretary General in the nuclear agenda found the impetus to raise further awareness of the civilian aspects of defence planning in the alliance.

4.2 Communication alternatives beyond the horizon

Another consequence of the nuclear agenda in the area of telecommunications was that the allies found themselves in need of other communication systems than the ones established in NATO's early years. This resulted in the construction of two new and highly advanced systems, first the ACE High Forward Scatter System constructed in the late 1950s, and second a satellite

[387] Summary record of meeting in SCEPC, January 28 1957. AC/98-R/3. NA; Note on Civil Communications Planning Committee, February 12 1957. AC/121-D/1. NA.
[388] Report by SCEPC to the NAC, February 8 1957. C-M(57)12. NA.
[389] Kaplan, *The Long Entanglement*, p. 62.

communications system introduced in the 1960s. In both cases, the initiative – technologically as well as financially – came from the United States. In this section, I argue that both systems can be understood as American attempts to pursue a specific technopolitical agenda in NATO, using its strong political position within the alliance and its technological superiority. The use of scientific and technological cooperation for implementing American foreign policy goals has also been recognised in previous research. Indeed, the United States became a major patron of science and technology among their allies during the Cold War, and thereby, as John Krige and others have argued, promoted a specific scientific agenda in a manoeuvre coined by Krige as 'consensual hegemony'.[390] In a similar vein, historians of communications have shown how the United States furthered particular agendas in telecommunications in the first decades of the Cold War.[391] I shall add a new perspective to these current understandings by looking into the American agendas in the area of telecommunications in NATO.

Forward scatter communications – a 'very fine' system

In response to the nuclearization, time became a 'prime factor' in NATO's planning in the area of communications. As a 1957 memorandum from the Standing Group of the Military Committee highlighted, "[t]he success of planned operations will be affected greatly by the smooth and efficient running of communications in the early stages of alert or at the outbreak of war".[392] Indeed, success in the initial phase appears to be paramount in the planning for a nuclear war.[393] As a result, the NATO member states began developing advanced systems for early warnings and high-speed communication systems

---

[390] Krige, *American Hegemony*, pp. 4f., 253f. See also Oreskes and Krige, *Science and technology in the global cold war*; Krige, "NATO and the Strengthening of Western Science"; Turchetti, "Sword, Shield and Buoys". In general, scientific cooperation typically had long-term goals such as reconstructing European scientific environments built on a consensus around an American model and strengthening transatlantic cultural bonds.

[391] For US Cold War diplomacy in relation to the transatlantic submarine telephone cables, of which the first, TAT-1, was laid in 1956, see Ward, *Information and Control*, p. 218f. For satellite communications, see: ibid., p. 230f.; Slotten, "Satellite Communications, Globalization, and the Cold War"; Slotten, "The International Telecommunications Union, Space Radio Communications, and U.S. Cold War Diplomacy".

[392] Note on requirements for Communications Electronics Personnel, October 4 1957. SGM-645-57. NA. Similarly, as Högselius et.al. have observed how communication plays a vital role in both defensive and offensive aspects of nuclear warfare, for instance in the setting up of a system for detecting and passing on information on an enemy attack. Högselius et al., *Europe's Infrastructure Transition*, p. 211.

[393] As Marc Trachtenberg has observed, the nuclearisation implied that "NATO would have to move fast" if a crisis broke out. Trachtenberg, *A Constructed Peace*, p. 164.

for command and control purposes.[394] The communication system, the ACE High Forward Scatter System, relied on the use of a new 'space', the higher atmosphere, for transmission of radio signals.

The construction of the ACE High Forward Scatter System marks a break from the policy adopted in the first years of the alliance's existence of renting circuits from national PTTs rather than constructing isolated military systems. The ACE High network, adopted by the allies in 1956, connected the entire Allied Command Europe region, from northern Norway across Central Europe and the United Kingdom to the eastern parts of Turkey. Forward scatter communications involve using the tropospheric and ionospheric layer of the atmosphere for beaming high frequency radio signals over long distances.[395] While such frequencies offer good cover to signals, they had previously only been used for communications over line-of-sight distances due to technical limitations.[396] In the ACE High Forward Scatter network, the tropospheric scatter technique was used on shorter distance links and the ionospheric scatter technique on longer distance links. The system was strictly for military communications and only contained the most critical circuits, those circuits that "must be in being when a war starts and must remain in being as the war proceeds", such as circuits for early warning and alert and those circuits needed to carry out the atomic strike plan.[397] For other purposes, NATO's commands would still need to rent circuits from the national PTTs.

When the idea of constructing such a communications system was first presented in NATO, it went hand in hand with a problematisation of the existing communications infrastructure as constituting a profound weakness. The system was presented to NATO's higher committees in December 1955, but prior to this, a study was made of the adequacy of the Allied Command Europe's existing communications system in which the Supreme Allied Commander Europe (SACEUR), General Gruenther, concluded: "At the present time, our communications are a dangerously weak link." Although much effort and money had been put into improving communications, the

---

[394] For the early warning system NADGE, see: Högselius et al., *Europe's Infrastructure Transition*, p. 211f.; Trischler and Weinberger, "Engineering Europe", pp. 60ff.; Gough, *Watching the Skies*.

[395] The troposphere is the lowest layer of the Earth's atmosphere, while the ionosphere is the part of the Earth's upper atmosphere beginning at an altitude of about 60 kilometres above the Earth's surface and ranging to 1000 kilometres. For more on the technique, see Monsen, "Fading Channel Communications".

[396] Accordingly, due to its ability to cover signals, the higher atmosphere became critical for telecommunications from the 1950s onwards. Se Turchetti, "Sword, Shield and Buoys", p. 206, p. 206.

[397] Presentation made by SHAPE's Chief Signal Officer, December 12 1955. Enclosure to MRM-7-56. NA; "SHAPE History – The New Approach (1953-1956)", p. 231. NA.

supreme commander was of the opinion that limitations had been imposed by both techniques and resources.[398]

Against this background, the supreme commander and SHAPE's American Chief Signal Officer questioned the security and suitability of the existing communication systems at a meeting in NATO's Military Committee on December 12 and at a ministerial session of the North Atlantic Council on December 15 1955.[399] More specifically, they problematised that the allies' use of radio links and land line circuits were vulnerable to attack, sabotage, and interference. The signal officer underlined in his presentation that the fact that most land lines leased from PTTs had been laid also for civilian use meant that their design and location – for instance passing through urban and industrial areas – made them highly vulnerable to atomic attacks and enemy sabotage. Moreover, he stressed that since more of the leased land line circuits were not available in peacetime, their activation in case of a crisis would be both time-consuming and dependent on the availability of civilian manpower. Regarding radio links, the signal officer accentuated the Russian capability of jamming the circuits in case of war. Some radio links were radio relay systems of which the reliability and security from jamming was higher, but these could only be used for short-range purposes and were excessive in cost and needed personnel. Furthermore, the signal officer explained how recent exercises had shown that time was a critical factor when implementing the plans made for wartime communications. The problem that it took days for circuits to become fully operational was according to the signal officer an indication "that we cannot place full reliance on such a method in the face of a possible surprise atomic attack." In fact, he argued, the present system "is totally unsuitable to meet vital requirements in the face of a surprise atomic attack".[400]

A key to understanding the background for the problematisation of the existing telecommunication facilities made by the supreme commander and the signal officer at the December meetings is to look at a possible solution that they both called attention to. In his address to the Council, supreme commander Gruenther referred to "a very fine communication system [...] called the 'Scatter' communication system" which had been established in the United States and Canada.[401] The signal officer explained in more detail how the technique of beaming high radio frequencies against the higher atmosphere had been developed by the Bureau of Standards in the United States in cooperation with the Armed Forces since the Second World War and had now

---

[398] Quoted in "SHAPE History – 1957", p. 226. NA.
[399] "SHAPE History – The New Approach (1953-1956)", p. 253. NA; Presentation made by SHAPE's Chief Signal Officer, December 12 1955. Enclosure to MRM-7-56. NA.
[400] Presentation made by SHAPE's Chief Signal Officer, December 12 1955. Enclosure to MRM-7-56. NA.
[401] "SHAPE History – The New Approach (1953-1956)", p. 231. NA.

"proven highly successful".[402] Gruenther concluded his address by recommending the NATO allies to adopt the forward scatter technique for the Allied Command Europe signal communications system. In doing so, he stressed that the forward scatter technique was advantageous in terms of reliability, for lowering the risk of jamming, and for lowering financial costs and manpower.[403]

In terms of costs, the supreme commander suggested to finance the implementation of the system by some sort of international project. But at a Council meeting in February 1956 when the system was discussed again, the US Secretary of Defence, Charles Wilson, stated that his government "was anxious to see the projects started as soon as possible" and declared that if NATO was willing to adopt the new system in the parts of Europe within the allied command, the United States were prepared to finance the establishment of certain initial links in order to get the project quickly underway. These links were a tropospheric link in Norway connecting Bodø and Oslo and an ionospheric link from Paris via Naples to Izmir in Turkey.[404] This offer was accepted by the NATO allies, and in July 1956, they agreed to make the additional links besides the US-sponsored ones part of the eight slice of the infrastructure programme.[405]

The introduction of the forward scatter technique in NATO was therefore an American agenda. The development and implementation of the technique was one of many American advances in military research and development in the early Cold War years.[406] In line with other examples of the United States becoming a 'patron' of science and technology among their allies, the forward scatter system is an example of how the United States used its powerful position in the alliance to promote a specific technological agenda. In this case, the aim was to build a system very different from that of 'common infrastructure', in which facilities were publicly owned by the European member states and operated by civilian technical personnel. This is illustrated

---

[402] Presentation made by SHAPE's Chief Signal Officer, December 12 1955. Enclosure to MRM-7-56. NA. At this point, the system was for instance in use within the US Air Forces linking Limestone, Maine, with Goose Bay, Labrador, and Thule on Greenland.
[403] "SHAPE History – 1957", pp. 226-227. NA.
[404] Note on proposal for establishment of a "Forward Scatter" System, February 29 1956. C-M(56)21. NA; "SHAPE History – 1957", pp. 227. NA. Prior to the meeting, the Military Committee had drawn up the requirements for a new system, see: Note on requirements for Allied Command Europe Signal Communications System, February 21 1956. MC.59(Revised). NA.
[405] Note on The Forward Scatter System, July 10 1956. C-M(56)93. NA; Note on The Forward Scatter System, October 12 1956. C-M(56)116. NA. See also Miller, *The Cold War – A Military History*, p. 52.
[406] By the mid-1950s, defence projects constituted more than half of all spending on industrial research and development in the United States. Reynolds, "Science, technology, and the Cold War", p. 379.

with the fact that the US forward scatter proposal was made on the condition that the system's facilities should remain a SHAPE property and be operated by allied military personnel.[407]

The viewpoint at SHAPE was that the new nuclear assumptions changed the premises for communications within the alliance. In particular, SHAPE found that the new assumptions necessitated that "the military authorities must have point-to-point communications under their own control."[408] This perspective was elaborated on by a SHAPE General in October 1956, when he gave a briefing to the Council on the importance of signal communications in the alliance. Here, the general referred to an investigation carried out by ELLA of the capability of the national PTTs to connect up the reserved circuits for wartime use in case of an emergency. The investigation called attention to a number of weak spots, for instance that circuits could not always be provided outside of normal office hours. This lead the general to the observation that

> "Bearing in mind that PTT circuit technicians are civilians and live at home with their families, the shock of an atomic attack by the enemy could well paralyse their efforts in initiating and implementing the immediate wartime switching of circuits."[409]

The general therefore concluded that there was "a very grave doubt" that the need for the most critical circuits in the event of a surprise attack would be met in time "to permit SACEUR to effectively accomplish his 'D Day' mission" – i.e. his counter attack.[410] In other words, the opinion in the European supreme headquarters was that signal communication was such a vital task that it could not be left to civilian telecom authorities. The general underlined the need for a new kind of system in the shape of the ACE High network, which was now under construction. His statement illustrates how the forward scatter system was the result of a new kind of system-building within NATO, driven forward by the United States and the American generals taking up the leading posts in NATO's European commands. With the forward scatter system, an additional 'layer' was added onto the existing communications systems of Western Europe, thereby developing a method to avoid the disadvantages that the use

---

[407] "SHAPE History – The New Approach (1953-1956)", p. 254. NA. However, the system materialised in such a way that NATO controlled the overall system, while each nation was responsible for providing the manpower and administrative support for the stations within its boundaries. See: Miller, *The Cold War – A Military History*, p. 52.
[408] Summary record of meeting in the Working Group on Wartime International Communications Requirements, July 12 1956. AC/109-R/1. Enclosure to AC/121-D/1. NA.
[409] Briefing by General Garland, October 3 1956. Annex to C-R(56)53. NA.
[410] Ibid.

of the public PTT network and civilian technicians involved in the eyes of NATO's military commands.

In reality, however, the ambition of creating a completely isolated military system was not fulfilled with the ACE High system, as the system was interconnected with civilian PTT systems. Thus, the civilian PTT technical living at home with their families remained a piece in the puzzle. The reliance on PTT facilities had financial causes. In late 1964, the North Atlantic Council asked a working group to conduct a screening of the communications facilities for NATO military purposes in Allied Command Europe. More specifically, the working group was asked to "recommend measures whereby operational requirements could be met [...] as economically as possible". Against this backdrop, the working group reached the conclusion in 1966 that it should be an ambition to make "maximum possible use" of the civilian PTT facilities in Europe. In this regard, the working group noted that civilian facilities should only be avoided "when it was desirable for sound military or economic reasons" to do so.[411]

Satellite communications – or, the 'vitality' of the alliance

Another high-tech communications project carried out in NATO was a satellite system. Following the October 1957 Soviet launch of the Sputnik satellite – marking the beginning of the Cold War 'space race', in which the Americans got off to a bad start with 'Flopnik', an unsuccessful American satellite launch in December 1957 – the United States devoted major efforts into space-related science and technology.[412]

Documents from NATO's communication agencies reveal that the topic of communications satellites began to appear among the allies in the early 1960s.[413] In 1964, the supreme commander in Europe asked the Standing Group of the Military Committee to obtain data on satellite communications from the NATO member states, in order to explore the possibilities of leasing satellite circuits in the national systems that were in the planning stage.[414] By

---

411 Interim report by the High Level Working Group to Review Military Communications Requirements, October 24 1966. C-M(66)93. NA. The High Level Working Group had been established by the North Atlantic Council in December 1964.
412 The immense investments in space research materialised in the 1958 establishment of the National Aeronautics and Space Administration (NASA). By the beginning of 1962, the US had launched sixty-three payloads into space, while the Soviet Union had launched fifteen. In 1962, the American company AT&T also launched the first commercial satellite, 'Telstar'. Högselius et al., *Europe's Infrastructure Transition*, p. 320; Reynolds, "Science, technology, and the Cold War", pp. 385-387.
413 For example, a satellite working group was established under the European Military Communications Coordination Committee (EMCCC): Note on Communications Satellites, September 28 1966. LOCOM 7265. NA.
414 Agenda for Thirteenth NATO C-E Board Meeting, March 9 1965. SGM-91-65. NA.

1964, more of the NATO allies were planning on joining in on the satellite adventure, and all NATO nations besides Greece and Turkey had signed in to the Intelsat collaboration, a US-initiated commercial satellite consortium, which took its beginning that year.[415] Moreover, British defence establishments had begun working closely together with the Americans on developing interoperable communications satellites to be launched by American rockets.[416] Therefore, the reasoning behind the supreme commander's interest was, as the Standing Group explained in an address to the member states in September 1964, that if there was a spare capacity in some of the planned national systems, NATO commanders could consider leasing circuits in these systems. Such satellite circuits could "improve or act as a back-up to existing communications" of the NATO commands and thereby help to "reduce the existing vulnerability and [..] make good the lack of multiplicity in existing communications".[417]

In general, the response to the Standing Group's satellite initiative was "not very encouraging", as a later note described. However, the Americans were persistent and continued in the following years to accentuate the advantages of taking in use satellite communications in NATO. In early 1965, the American ambassador to the North Atlantic Council brought up "the possibility of a cooperative NATO effort in the defense communication satellite field" to his colleagues in the Council.[418] This suggestion was backed up by NATO's Committee of Defence Research Directors, who agreed that in view of the current advances in satellite technology, "it would be fruitful to study anew the possible NATO use of satellite communications".[419] In June 1966, the United States brought the topic on the agenda again and suggested to the Council that a part of the United States Advanced Defence Communication Satellite Program might be made available for NATO purposes. This offer was followed up in late September, where the Deputy Director of the US Defense Communications Agency gave a briefing to the Council on the American satellite programme, and the US ambassador to the Council followed up on the briefing with a proposal for "a cooperative program of action leading to the

---

[415] The Intelsat consortium, of which the United States owned the majority, was established in 1964. In total, nineteen nations joined: The NATO nations (besides Greece and Turkey) along with Australia, Austria, Japan, Spain, Sweden, Switzerland, and the Vatican City. The Intelsat collaboration lead to the 1965 launch of the 'Early Bird' satellite. Huurdeman, *The Worldwide History of Telecommunications*, pp. 413-428; Hugill, *Global Communications Since 1844*, p. 233.

[416] Krige, *Sharing knowledge, Shaping Europe*, p. 102.

[417] Note on Satellite Communications, September 8 1964. SGM-0123-64. NA.

[418] Note on Communications Satellites, September 28 1966. LOCOM 7265. NA.

[419] Note on Satellite Communications, May 20 1965. LOM 198/65. NA. Further to this, a number of study groups and committees in NATO began considering the various aspects of satellite capabilities. See for instance: Agenda for Thirteenth NATO C-E Board Meeting, March 9 1965. SGM-91-65; Agenda for Fourteenth NATO C-E Board Meeting, March 14 1966. SGM-0075-66. NA.

use of communication satellites as an integral part of an overall NATO communication system."[420] According to the US ambassador,

> "a satellite capability would add significantly to the flexibility, the reliability, and the survivability of a future communication system linking NATO military headquarters to the furthest tactical and strategic forces and to ships at sea – and providing command and control communications to and among our defensive forces."[421]

The American ambassador further concluded that it would be entirely feasible to introduce NATO quickly into the field of satellite communications, and at a relatively modest common cost, provided the allies moved quickly. Moreover, the American ambassador referred to the signal value of the satellite project:

> "I would remind the Council that such a move on our part on the frontiers of modern defense technology would be dramatic evidence of the vitality of this Alliance as we approach our twentieth birthday."[422]

The reference to NATO's approaching twentieth anniversary is noteworthy. What was remarkable about this event was that by its birth in 1949, the North Atlantic Treaty was granted a 'lifetime' of twenty years to begin with. After twenty years, the member states were according to article thirteen of the treaty given the option of leaving the pact with one year's notice.[423] Therefore, in the mid-1960s when the anniversary was approaching, a debate on the purpose and future role of the alliance was raised among the allies. The debate played out in the period of détente that had emerged in the East-West relations upon which the legitimacy and raison d'être of the alliance was called into question. Moreover, the debate was further intensified with France's decision in the spring of 1966 to leave the integrated military structure of NATO.[424]

In the eyes of the ambassador, the anniversary invited for investments in modern technologies such as satellites. Since the late 1950s, science and technology cooperation had figured as a 'third dimension' of the alliance – additional to the military and political dimensions. This turn had its roots in the so-called 'Three Wise Men' exercise initiated in 1956. Here, the foreign ministers of Norway, Italy, and Canada were asked by the North Atlantic

---

[420] Note on Communications Satellites, September 28 1966. LOCOM 7265. NA.
[421] Ibid.
[422] Ibid.
[423] "The North Atlantic Treaty", April 4 1949, article 13. NA-E.
[424] Wenger et al., "New perspectives on NATO history", p. 3f.; Bozo, "Defense Versus Security?".

Council to conduct a study of ways to improve the non-military cooperation within the alliance in order to develop "greater unity within the Atlantic Community".[425] One of the things that the report by the Three Wise Men called attention to was the need for increased cooperation on science and technology, leading to the decision by the North Atlantic Council in December 1957 – in the wake of Sputnik – to establish a Science Committee.[426] For the Americans, as John Krige has noted, this project involved promoting a positive image of the United States by "exporting the best it had to offer" and furthering the welding together of the NATO allies in a community based on a core set of values. In this regard, achievements in science and technology were articulated as the strength of the free world.[427]

Previous historical research has documented how the United States used satellites as a tool of Cold War diplomacy. In his analyses of satellite communications as a tool of US soft power, Hugh Slotten shows how the Kennedy and later the Johnson administration worked for the establishment of a global satellite communications system. This took form with the 1962 establishment of Communications Satellite Corporation (COMSAT) and the 1964 successor International Telecommunications Satellite Organization (INTELSAT). The American political efforts aimed at including the Third World in a 'single world system', instead of creating a system that only served profitable routes to for instance Europe.[428] Accordingly, satellites were an important tool in the Cold War 'battle of hearts and minds'.[429]

Within NATO, however, the US strategy seems to be one of framing satellite communications as a response to urgent needs of the alliance. In his September 1966 address, as described above, the American Ambassador, called attention to the need to 'move quickly'. This is likely a reference to the circumstance that NATO at this point was preparing a major relocation. This was caused by the French withdrawal, which had also led President De Gaulle to declare that NATO's military headquarters should depart French territory

---

[425] Krige, *American Hegemony*, p. 200. The background for the exercise was a concern by the American Foreign Minister Dulles that the Atlantic unity would crumble in a period of détente. See also: Villaume and Olesen, *I Blokopdelingens Tegn*, p. 349.
[426] Krige, *American Hegemony*, p. 203; Krige, "NATO and the Strengthening of Western Science", p. 88f.; Turchetti, "Sword, Shield and Buoys".
[427] Krige, *American Hegemony*, p. 257.
[428] By contrast, the Eisenhower administration had perceived satellites along the same lines as other commercial forms of communications technologies allowed the AT&T to develop plans for global satellite systems. The Kennedy administration did not allow AT&T to pursue these plans. See: Slotten, "International Governance, Organizational Standards, and the First Global Satellite Communication System", p. 525f.; Slotten, "Satellite Communications, Globalization, and the Cold War";
[429] As Högselius et al have noted, it was a general tendency for both the United States and the Soviet Union to downplay the military purposes of developing satellites. Högselius et al., *Europe's Infrastructure Transition*, p. 320.

by April 1967. The plan was to relocate SHAPE to Camp Casteau south of Brussels in Belgium, and for this purpose, new communication facilities were needed. In this regard, the American ambassador to NATO underlined in his September 1966 address to the Council that what was particularly required was a North-South link connecting Casteau with Naples where the Commander-in-Chief of the Allied Forces Southern Europe (CINCSOUTH) was located.[430] For this purpose, the US ambassador found that a satellite communications system operating under military control would be the most adequate means for meeting the communication requirements. The ambassador emphasised that it would be achievable to have a North-South link for experimental purposes ready by about the time SACEUR moved into the new headquarters and that an operational satellite capability could be ready by early 1968. The offer from the United States implied that the Americans would make available their systems for preparations and test at US expense. NATO should then, at a common expense, obtain two satellites, including the connected ground terminals and associated equipment. Moreover, the Unites States offered to design their advanced operational system in a way that took NATO's needs into consideration.[431]

By posing this offer, the United States put immense pressure on their allies, as the Americans made it clear that NATO would have to move fast, if they wanted to join in on the satellite adventure, since the United States' own programme could not be delayed. As all delegations expressed support of the US initiative, SHAPE declared that the headquarters was "highly interested in the introduction of communications satellites into the NATO inventory, both from the longterm point of view and to immediately improve our communications posture after relocation."[432] NATO's first experiments with satellite communications in the years 1967-1969 made use of already orbiting US satellites, the Lincoln Experimental Satellites LES-5 and LES-6.[433]

After testing mobile ground stations with these experimental satellites, NATO launched the next phase of its satellite programme, marked with the March 1970 launch of the first NATO communications satellite. The satellite was connected with twelve ground stations constructed by the other participating countries and thereby linked the NATO Headquarters in Brussels with national capitals and NATO commands on land and sea.[434] A second satellite was launched in January 1971 followed by four more in 1976,

---

[430] Note on Communications Satellites, September 28 1966. LOCOM 7265. NA.
[431] Ibid.
[432] Ibid.
[433] NATO TACSATCOM Program, September 29 1969. Press Release 69(8). NA; Miller, *The Cold War – A Military History*, p. 52.
[434] The participant were Belgium, Canada, Federal Republic of Germany, Italy, the Netherlands, Norway, the United Kingdom, and the United States. See: NATO TACSATCOM Program, Press Release 69(8), September 29 1969. NA.

1977, 1978, and 1984, all of them constructed in the United States, but funded through NATO's common infrastructure programme. It is noteworthy that the discourse around satellites changed by the time of the launch of the first satellite. A March 1970 press release made in connection with the launch emphasised that the "NATO satellite system will not only provide better military communications but will also improve the existing communication facilities for political consultation and crisis-management."[435] At this point, as I will explore in the next section, the NATO allies had agreed on a strategic shift to that of 'flexible response' and formally made the achievement of détente a NATO aim.[436] As a result, increased attention was paid to the vital role of crisis management in critical situations.[437] Satellite communications harmonised well with this agenda as an ideal means for long distance communications between different regions of NATO, not least for trans-Atlantic communications.

4.3 Flexible communications for flexible responses

With the adoption of the flexible response strategy and the increased focus on crisis management, a new technopolitical agenda emerged in the area of telecommunications by the end of the 1960s. Besides changing the discourse around satellites, this also paved the way for a new, integrated communications system, which I shall explore in this section.

In the spring of 1967, NATO's Defence Planning Committee began revising the overall strategic concept of the alliance. This resulted in the adoption of the 'flexible response' strategy approved by the North Atlantic Council in December 1967.[438] The idea behind flexible response was that NATO's use of weapons in a future war would be based on a flexible scale, beginning with conventional weapons and – if necessary, depending on the enemy's response – escalation to small tactical nuclear weapons or, as a last resort, the H-bomb.[439] An important background for the strategic shift was the introduction of intercontinental missiles replacing bomber aircrafts around

---

[435] NATO Communications Satellite, March 11 1970. Press Release (70)2. NA.
[436] The focus on détente as an aim to pursue by NATO is related to the Harmel exercise of the mid-1960s. In response to the French decision to leave NATO's military string, the Belgian Foreign Minister Pierre Harmel initiated an examination of the future political and military tasks of NATO. The resulting report, adopted in December 1967, marks a turning point in NATO's history, and caused, among other things, NATO to take a more active role in improving East-West relations. See: Villaume, "Harmel-rapporten"; Villaume and Olesen, *I Blokopdelingens Tegn*, p. 587f.; Wenger, "NATO's transformation in the 1960s", p. 235f.; Bozo, "Defense Versus Security?".
[437] Petersen, "Krisestyring".
[438] Final Communiqué of ministerial meeting in the NAC, December 13-14 1967. NA-E; Report by MC to the DPC, January 16 1968. MC 14/3(Final). NA.
[439] Villaume and Olesen, *I Blokopdelingens Tegn*, p. 644; Hatzivassiliou, *NATO and Western Perceptions of the Soviet Bloc*, p. 163.

1960. This shift left the United States more vulnerable to attacks than before, and thereby challenged the premise for the strategy of massive retaliation. For the Americans, this created a need for having several options available when responding to an attack, also conventional weapons, thereby providing a better control of how a conflict would escalate. With these thoughts the Kennedy Administration introduced the strategy of 'flexible response' as a new American military doctrine in 1961.[440]

The importance of telecommunications as a vital tool in crisis management was manifested in the early 1960s. In 1961, difficulties with communication between different agencies within the US government had contributed to the failure of the Bay of Pigs invasion, and during the October 1962 Cuban missile crisis, President Kennedy had been unable to communicate "in timely fashion" with other foreign leaders. Shortly before, in August 1962, the US National Security Council established a subcommittee on communications called the Orrick Committee in order to prepare a national communications system, which came into being in august 1963. The system facilitated worldwide US military communications and provided a 24 hour "communication response capability" at key diplomatic posts around the world. Additionally, in March 1964, a Special Assistant to the President for Telecommunications was appointed.[441] Moreover, directly triggered by the October 1962 crisis, the so-called 'hot line', a direct teletype link, opened between Washington and Moscow with the purpose of providing direct communications between the superpower leaders, not least in times of tension and crisis.[442]

In NATO, the role of communications was also considered after the adoption of the new strategy in 1967. In December 1969, the Defence Planning Committee – a committee formed in 1963 as the ultimate authority on all questions related to NATO's integrated military structure – adopted a plan for how to implement the new strategic concept of flexible response. In this document, it was emphasised that the "requirement for flexibility and timeliness in response to rapidly moving situations necessitates a modern military command, control, and communications system, largely oriented towards automation" and that it was essential to link national authorities, NATO political authorities, and NATO military authorities with "rapid, survivable, secure and reliable communications."[443] A later Danish note explains that the Defence Planning Committee in continuation hereof

---

[440] Petersen, "Afskrækkelsespolitik".
[441] Slotten, "The International Telecommunications Union, Space Radio Communications, and U.S. Cold War Diplomacy", p. 332f.; Lewis, "Telecommunication: Critical Infrastructure Protection", p. 1.
[442] Egilsson, "The Origins, Use and Development of Hot Line Diplomacy".
[443] MC 48/3(Final), December 8, 1969. NA.

suggested to implement a "full integration" of all NATO communications, which later materialised in the so-called NATO Integrated Communications System (NICS).[444]

An event which is likely to have contributed to the recognition of a need for integrated and rapid communications was the August 1968 Warsaw Pact invasion of Czechoslovakia. Previous research has called attention to the inadequacy of NATO's crisis communications on this occasion. Evanthis Hatzivassiliou has described how three NATO governments had been warned about the invasion by Soviet ambassadors in advance but failed to inform the NATO headquarters about it. Instead, NATO's headquarters learned the news from a Prague radio broadcast. The reason for this was that the only wire service tele printer available at the headquarters' situation centre had been out of order and the officer in charge had left his post for the night.[445] This situation centre had been established after the relocation to Belgium following the 1966 French withdrawal from NATO's military command structure. The relocation paved the way for a common civil-military situation centre, which would "provide the council with the facilities and data needed for consultation and decision in time of tension or crisis", and, moreover, "provide the Military Committee the facilities and data base required for analysis of the NATO military situation in order to provide military advice to the Council and strategic guidance to the Major NATO Commanders."[446] Thus, the focus on the role of communications in crisis management was acknowledged before the formal adoption of the flexible response strategy and the August 1968 events. Although it is difficult to estimate the importance of such single events for further developments in communications planning, the invasion of Czechoslovakia caused in particular the European NATO members to be alarmed by the speed with which the Soviets had operated. The concern in Western Europe was that a future Soviet operation would happen too quickly for NATO to have time to pass on warning and act on it.[447] However, plans for improving communications in NATO's Central European region were already on the table prior to August 1968.[448] In any case, the August 1968 events

---

[444] Note by FKO on NICS, June 1977. ITTS, NALLA Denmark, Journalsager, 9, 46C. RA.

[445] Hatzivassiliou, *NATO and Western Perceptions of the Soviet Bloc*, p. 173f. See also Villaume and Olesen, *I Blokopdelingens Tegn*, p. 626. Since the situation centre was not an operations centre, it was only planned to be manned during normal working hours. See: Telegram from MCREP to NAMILCOM, November 11 1966. LOCOM 7385. NA.

[446] Memorandum for the members of the MC, March 17 1967. IMSWM-6-67. NA. See also Memorandum for the members of the MC, January 26 1967. MCWM-23-67. NA; Note on satellite communications, March 7 1967. LOCOM 7794. NA.

[447] Hatzivassiliou, *NATO and Western Perceptions of the Soviet Bloc*, p. 173f.

[448] Note by FKO on NICS, June 1977. ITTS, NALLA Denmark, Journalsager, 9, 46C. RA.

underlined how the flexible response strategy eventually rested on the existence of rapid internal communications among the NATO allies.[449]

The available source material related to the Defence Planning Committee's suggestion to establish an integrated communications system is still limited in scope, which poses a challenge for my aim of examining the technopolitical ambitions related to the system. While it is possible to outline the overall technical developments, the available material does not reveal much about the multilateral political negotiations related to the process.

In overall terms, the idea behind the integrated communications system involved the combination of different means of communications for both civilian and military purposes. Upon initial studies carried out by SHAPE's Technical Centre, the system was discussed and the final concept hereof eventually adopted in December 1970 at NATO's ministerial session. As described in 1980 in an international technical journal, the national ministers of defence agreed that "all communications necessary to meet NATO's requirements should be integrated into a single common user system to be called the NATO Integrated Communications System (NICS)"[450] A press release from NATO's Information Service explained how NICS would help improve consultation and control within the alliance in time of tension.[451] More specifically, the idea behind NICS was to provide direct communications between NATO Headquarters and all the NATO capitals, as well as three major NATO Commanders, through a network incorporating fifty-seven stationary nodes, five active transportable nodes, seven stand-by transportable nodes, four gateways, eighteen telegraph automatic relay equipment (TARE), thirty-eight satellite earth stations, one SATCOM III satellite, along with the ACE-HIGH tropo-scatter network and rented circuits from national PTTs.[452] The NICS project was finally approved by the Council in the spring of 1971, whereby the NICS Organisation (NICSO) responsible for the implementation of the system was established.[453] NICS would be implemented in two stages, of which the first involved the incorporation of the ACE High forward scatter system and the elements of the satellite communications programmes into an integrated communications system. This stage involved five different programmes and was scheduled to be completed by 1983, whereas the second

---

[449] For a discussion on the role of the August 1968 events for NATO as an alliance, see McGinn, "NATO in the Aftermath of the 1968 Invasion of Czechoslovakia".
[450] Wentz and Hingorani, "NATO Communications in Transition", p. 1524.
[451] NATO Latest, no. 17, December 2 1970. NA.
[452] Nato Today, 1987, p. 39. NA; Note by FKO on NICS, June 1977. ITTS, NALLA Denmark, Journalsager, 9, 46C. RA.
[453] Ibid. NICSO consisted of a policy organ, the NATO Joint Communication-Electronic Committee (NJCEC) composed of a civil and a military member from each country, and an executive organ, the NICS Management Agency (NICSMA).

stage was estimated to be completed in 1995 but never set in motion.[454] It appears from a 1972 document from the Danish telephone company JTAS that on a national level, the plans involved the establishment of NICS switching centres in order to link up NATO's military communications systems to the existing national PTT network.[455] In this way, the NICS system provided multiple interconnections between various military and civilian communications systems and thereby added increased flexibility and redundancy into NATO's communications.[456]

From a technological point of view, the NICS system can be understood as an additional and integrative 'grid' on top of all existing and planned systems. A Danish report later outlined how the system "builds on a utilization of all existing and future transmission media".[457] Politically, the implementation of NICS reflects, on the one hand, the increased focus on crisis management brought along by the 1967 strategic shift towards flexible response. The focus on crisis management must also be understood in the wider context of détente. In contrast to the forward scatter system and the satellite projects, the available source material related to the integrated communications system does not suggest that this system was brought forward in the same way by American technopolitical ambitions. On a different note, recent historical research on transatlantic relations in the 1970s has outlined how the transatlantic power balance shifted in these years and how European actors with greater success began setting the agenda in NATO.[458] It is likely that NICS must also be understood in the context of a shifting transatlantic power balance, but the source material does not allow me to explore the multilateral political negotiations, including the American-European power balance, in more detail. However, a 1974 document from the Defence Planning Committee calls attention to the importance of another factor, namely that the implementation of NICS happened in a period of economic crisis:

> "It is readily recognised that NATO and the NATO nations are all experiencing military budget problems. By integrating/interconnecting NATO and appropriate national military communications systems, it is possible that considerable funds could be saved from both NATO and national budgets. At the same time, NATO and NATO

[454] C3I, "NICS (NATO Integrated Communications System)".
[455] Letter from the P&T to JTAS, June 1 1972. JTAS, Journalsager 1896-1988, 211. RA.
[456] Kelleher, "NATO Nuclear Operations", p. 460.
[457] Note by FKO on NICS, June 1977. ITTS, NALLA Denmark, Journalsager, 9, 46C. RA.
[458] Villaume et al., "Introduction: The 'Long 1970s'".

> nations could realize a more survivable, reliable and flexible communications system".[459]

Many aspects of the collaboration on communications in NATO's later Cold War years are yet to be uncovered. Material from Danish archives suggest that NICS was the pivotal point for developments in internal communications systems in NATO for the rest of the Cold War period. Moreover, the collaboration in ALLA (which ELLA was renamed in 1965) and CCPC continued to be important forums for negotiating transnational communications aspects within NATO.

Concluding remarks

This chapter has traced the developments in telecommunications system-building within NATO in the period from the 1950s through to the 1980s with the aim of examining how communications within NATO interacted with political and military developments and were pushed forward by different actors with different agendas. In conclusion, I shall highlight three aspects hereof.

First, the chapter has demonstrated how the adoption of the nuclear assumptions in 1954 became a decisive factor for the ongoing networking of the alliance. In chapter two, I explored the early years of infrastructural integration in NATO, where the construction of new links and the interlinking of existing communications systems took place within the framework of the common infrastructure programme. This construction of in particular cables and radio links through the common infrastructure programme continued, but as this chapter has explored, the nuclear assumptions added new dimensions to the telecommunications system-building. The nuclear agenda led to an increased awareness about the vulnerability and survivability of the existing communications networks in the member states. I have shown in this chapter how this awareness was connected with a political push for an increased focus on the mobilisation period of a future war. In the next chapters, I shall demonstrate how the nuclear agenda came to influence communications planning on a national level. Moreover, from a military strategic point of view, the nuclear assumptions exerted new demands on communications for command and control purposes, leading to the establishment of the forward scatter communications system.

Second, the chapter has shed light on the role of the United States in furthering specific technopolitical agendas of telecommunications within NATO. Technopolitical agendas, in this connection, were both a matter of

[459] Note on Policy for the Use of NATO and National Communications Facilities for Defence Purposes, February 5 1974. DPC/D(74)2, Annex to AC/121-D/526. NA.

enacting political goals through technology and technological goals through politics. Based on US initiatives, the NATO countries embarked on the projects of establishing the ACE High forward scatter and the satellite communications systems, two highly advanced and extremely expensive technological endeavours. The systems were partly financed through the common infrastructure programme – and, in a 1989 publication from NATO's Infrastructure Committee, accentuated as two of the major accomplishments in the subcategory of communications in the infrastructure programmes.[460] However, it is difficult to imagine the making of the systems without the United States playing the role of the patron providing both capital and technological knowledge. This mirrors the picture presented in previous research by i.e. John Krige and Simone Turchetti of US patronage in NATO's scientific cooperation.[461] For the United States, besides having specific military objects, these systems also served the purpose of introducing US-developed technologies into Europe. Moreover, the new technologies of forward scatter and satellite communications constituted alternatives to the existing practice of using national communications systems owned and operated by the civilian PTTs in Western Europe.

As a third and final point, I shall stress that American technopolitical agendas were only one of more factors in telecommunications system-building within NATO. Communications systems were established within the framework of the shifting strategic patterns of the alliance, but also within the scope of general political-economic state of affairs. In particular, the general problem of balancing defence expenditures with societal investments of another kind – serving security purposes in a broader sense – also pertained to the area of communications, not least given the very costly character communications technologies. Due to financial circumstances, the networks operated by the PTTs continued to be the backbone of much of NATO's communications within allied Europe. This had the consequence that national communication authorities continued to play a key role in the security governance of telecommunications, including the planning for communications preparedness in case of a war. This shall be further explored in the next chapter.

Besides adding a new dimension to the history of communications, the examinations in this chapter also provides new empirical knowledge to the extensive historiography on NATO during the Cold War, in which the area of communications has not yet received much scholarly attention. In doing so, the chapter opens the way for new research queries. One is the role of other actors in the networking of NATO than the ones I have focused on in this chapter.

---

460 "NATO Common Infrastructure", 1989. NA.

461 See for instance Turchetti, "Sword, Shield and Buoys"; Krige, "NATO and the Strengthening of Western Science".

For practical reasons, I have not been able to delve into the position of different member states on NATO's communications policy. Research into other examples of technical system-building in NATO has revealed how the negotiations related to these systems involved immense rivalry among the member states.[462] This was not least a consequence of the significant financial importance of such technological facilities carried, and it is very likely that similar examples can be discovered when delving deeper into the communications system-building in NATO. Moreover, along with other construction works in NATO, the communication projects came into being on the basis of a comprehensive bidding process, and it is therefore also necessary to investigate the role of private businesses in this process.

[462] See for instance Thies, *Friendly Rivals*; Gough, *Watching the Skies*; Högselius et al., *Europe's Infrastructure Transition*, p. 211f.; Trischler and Weinberger, "Engineering Europe", pp. 60ff.; Gregory, *Nuclear Command and Control in NATO*.

[5]

If war comes

The governance of telecommunications security in Denmark, 1950s-1980s

> On the morning of May 3rd 1956, EASTLANDIC forces began an all-out attack against the Allied Nations of WESTLANDIA. Unconfirmed reports had beforehand indicated that EASTLANDIC military forces were in the highest state of readiness seen in years, but no specific warnings of preparations for a war had been given. The morning attack, supported by atomic weapons, was primarily targeted against Central Europe, but also the United Kingdom and Southern Europe were stricken. Additionally, the Danish island Bornholm in the Baltic Sea was attacked by amphibious forces. At 0600 hours, a general alert was declared. After this, a number of incidents doing damage to the Danish telecommunications network occurred: The connection to Bornholm was interrupted; the landline cable to Northern Germany was cut by enemy forces; the submarine cable between Jutland and Zealand (Aarhus-Kalundborg) was damaged; and the submarine cable to the Netherlands was interrupted, first due to a damaged submerged repeater and later due to a bomb attack on the repeater station at the island of Rømø.[463]

The above scenario played out in a 1956 NATO signal exercise, named 'SIGEX TWO'. With the prospect of an all-encompassing future war, the NATO allies carried out a number of signal exercises with the purpose of testing the management of telecommunications in Western Europe in wartime. Detailed plans were made as for how to deal with the scenarios to be expected in case of a war, such as increased needs for communication facilities for defence and emergency purposes and the occurrence of incidents doing damage to the communication networks.

The signal exercises were one of many elements in the general preparedness planning in the area of telecommunications that began in

[463] AFNORTH Exercise instructions for SIGEX TWO, April 25 1956. ITTS, NALLA Denmark, Emneordnede Sager 1950-1985, 2. RA.

NATO's member states in the 1950s. As evident from chapter four, the introduction of the nuclear agenda in NATO brought along a new awareness as for how the home front was protected against a nuclear attack and could be upheld in a future war. In this chapter, I delve into the planning for wartime in the area of telecommunications in Denmark, examining how the prospect of nuclear war and the accompanying total preparedness agenda translated into concrete undertakings. I do this by analysing different cases of war preparations in relation to telecommunications – cases which I have identified on the basis of thorough archival studies.[464] In general, this involved two different problems: First, how could the existing telecommunications infrastructure be protected, even against the threat of a nuclear attack? And second, how were communications to be organised and distributed in case of a war? I understand the solution to both problems as a technopolitical one, since both technological possibilities and political priorities defined the scope of possible action. By studying the security governance related to these cases, i.e. the many different negotiations, decisions, and concrete preparations taken in peacetime with a view to wartime by the involved actors – military personnel, politicians, civil servants, as well as civilian, technical experts – I am able to identify the technological and political agendas that the different stakeholders sought to promote.

In doing so, I show how the governing of telecommunications security in the Cold War period was increasingly transferred to the realms of civilian, technical experts. This development was, on the one hand, driven by a political push for establishing continuity between the solving of societal tasks in peacetime and wartime, in accordance with the so-called 'sector responsibility principle'. On the other hand, the development was also caused by technological developments towards increased complexity in telecom networks, which to a larger extent defined the political scope of action. Put in another way, what should be secured was determined by what could be secured. The chapter thereby provides new perspectives to existing historical research on telecommunications security, which has tended to focus on measures to avoid for instance cable cutting or radio jamming or on the protection of dangerous content in the form of surveillance and censorship. I argue that such perspectives must be broadening to also cover measures taken to uphold communications critical for the society in crisis situations. Moreover, the chapter adds important knowledge to current historical understandings of the Danish Cold War total defence by demonstrating how 'sector responsibility' came into being in a specific societal sector.

[464] For this purpose, my point of departure has been the archives of NALLA Denmark, a central agency for communications preparedness planning.

The chapter is structured thematically rather than chronologically, but overall, the period from the early 1950s to the 1980s is under scrutiny. The chapter consists of four sections. In the first, I delve into the plans made for the organisation of telecommunications in wartime and more specifically the establishment and development of the aforementioned wartime agency for telecommunications, the National Long Lines Agency (NALLA). Second, in continuation hereof, I study the plans implemented for how to prioritise essential traffic in wartime and, eventually, also in peacetime. Third, I turn the focus towards the plans for physically securing the communications infrastructure, including the aforementioned 60 million kroner plan, and finally, in a fourth section, I study the particular problem of managing transnational communication links in wartime. Before turning my focus to wartime planning on telecommunications, however, I shall shortly look into how preparedness planning was dealt with politically in Denmark in the early Cold War years.

Planning for the total war

In chapter four, I outlined how awareness for 'the home front' emerged on the NATO agenda in the early 1950s. Considerations for how to prepare for the maintenance of the society in wartime were also made in Denmark at this point. In the first post-war years, preparedness planning was primarily a matter of planning for the protection of the civil population in wartime, which was not least based on the experience of the Second World War. A Danish report on civil defence issues from 1946 stressed how it was necessary "to meet the total War with a total Defence".[465] These concerns led to the April 1949 establishment of the Civil Defence [Civilforsvaret].[466]

However, within NATO, as outlined in chapter four, protecting the society involved more than a civil defence. Upon the 1952 initiative of Secretary General Lord Ismay, increased focus was paid to different aspects of civil organisation in wartime. In Denmark, these issues were initially discussed in the aforementioned Committee for Defence Economy, established by the government in 1950, which began studying different problems of logistic for the civil society in wartime. Such problems were later referred to as the 'economic preparedness' and involved planning of for instance the electric

[465] Report from the Ministry of Interior's Air Defence Committee, 1946. Quoted in "Det danske totalforsvars historie", p. 3. IM, SCB, Sekretariat for Civilt Beredskab, 1. RA.
[466] The Civil Defence was established in 1949 as a successor to the State Civil Air Defence [Statens Civile Luftværn], which had existed since the late 1930s. In this connection, it can be mentioned that a 1951 NATO review highlighted how Denmark had placed particular emphasis on civil defence measures and at an earlier stage than in most other countries initiated a thorough reorganisation of the civil defence. See: Report on the Status of Denmark's Defence Efforts, September 15 1951. C7-D/9. NA.

supply in wartime. Moreover, a working group in the Prime Minister's Office began in 1951 to consider plans for how to evacuate the government, the parliament, and the state administration in case of war.[467] This also involved considerations for communications – an aspect already slightly touched upon by other historians. Henrik Stevnsborg, studying the Danish police during the Cold War, has described the establishment of a telephone cable from the police headquarters in Copenhagen to a telephone exchange in Roskilde west of Copenhagen in 1951, ensuring that the headquarters could communicate with the rest of the country even if telephone exchanges in Copenhagen were destroyed by sabotage or other enemy action.[468] Bent Jensen has mentioned a "secret telephone circuit" between central members of government and senior officials that was established in the early 1950s, although it remains unclear what kind of network he refers to.[469]

Beginning in 1955, Danish authorities began giving higher priority to civil emergency planning. This can be understood as directly occasioned by NATO. In continuation of the North Atlantic Council's May 1955 decision of basing the alliance's civil emergency planning on the 'new assumptions', i.e. the nuclearisation, thereby paying increased attention to the initial, critical phase of a future war, Denmark was asked in May 1955 to embark upon the work of carrying out comprehensive emergency plans.[470] Moreover, in response to the November 1955 establishment of the Senior Civil Emergency Planning Committee in NATO, the Danish government established a Government Committee for Civil Emergency Planning [Regeringsudvalget for Civilt Beredskab] the following year, in December 1956.[471] The Government Committee was chaired by the prime and foreign minister, H.C. Hansen, indicating that civil preparedness was indeed a highly prioritized task for the government.

---

467 "Den centrale, generelle planlægning.", p. 6f. IM, SCB, Sager vedr. det civile beredskab, 5. RA; "Ministeriernes og styrelsernes administrative beredskab", p. 2f. IM, SCB, Sager vedr. det civile beredskab, 7. RA.

468 Stevnsborg, *Magt, krig og centralisering*, p. 256.

469 Jensen, *Ulve, Får og Vogtere 2*, p. 249. Jensen refers to a file in the archives of the Danish Foreign Ministry (105.N.4), but this file concerns evacuation and refugee problems in a future war. There did exist an arrangement for the prioritisation of essential telephone traffic, which I shall get back in section 5.2.

470 Ibid., p. 257.

471 The member states were asked to send the heads of their national organs for civil emergency coordination to participate in SCEPC's meetings. In Denmark, as an interim solution, the chairman of the Committee for Defence Economy was persuaded by the Foreign Ministry to represent Denmark, and in July 1956, the committee recommended the government to establishment a new, coordinating committee for civil emergency planning. See: Note on national coordination for civil emergency planning, January 24 1956. AC/98-D/11. NA; Letter from IM, December 28 1955; Note about the government committee for civil emergency planning, December 2 1956. IM, SCB, Sager vedr. det civile beredskab, 5, Dokumentation. RA.

While the military aspects of preparedness planning were handled by the defence and the task of preparing the population for war or crisis lay with the Civil Defence, civil preparedness planning focused on preparing the civilian part of the public administration for war. The Government Committee for Civil Emergency Planning began reviewing the state of preparedness in different areas, for instance by appointing a 'press committee' to investigate how to carry out public information and press activities in times of a crisis or war.[472] Prime Minister H.C. Hansen explained to the Parliament at a later occasion that one of the most urgent tasks in the committee had been to make plans for how to secure the public telecommunications network and make sure that a wartime relocated government and central administration were capable of communicating securely and reliably.[473] Moreover, the Government Committee for Civil Emergency Planning worked on preparing a law to regulate responsibilities of preparedness planning in the Danish society, which was adopted by the Danish parliament in late 1959.

In previous historical examinations, the development of a Danish civil preparedness apparatus in the 1950s has been studied as a token of the threat perceptions that existed in Danish politics at this point. Bent Jensen has argued that these preparedness initiatives show how seriously Danish authorities and politicians took the communist threat, but also how they failed to realise a substantial level of preparedness.[474] Poul Villaume, by contrast, has touched upon the civil preparedness planning as part of Denmark's integration into NATO and shown how Danish authorities, despite NATO's nuclearisation, kept planning for a conventional war for some years.[475] Against this backdrop, I take a different approach in this chapter by focusing on how the civil preparedness agenda translated into concrete undertakings in a specific societal sector.

The 1959 law on civil emergency planning provided a framework for further developments in this area for the rest of the Cold War period. The law was presented to the parliament in March 1959 and adopted in December 1959.[476] It gave the ministries an authority to give orders to public institutions and private companies about taking preparedness measures within their field of operation. A section of the law stated that the planning of civil preparedness should be based on the principle that the authority in charge of a function in

---

[472] Jensen, *Ulve, Får og Vogtere 2*, p. 260f.
[473] FTT 1958-59, Forhandlinger III, col. 3541f.
[474] Jensen, *Ulve, Får og Vogtere 2*, p. 217, 274f. Bo Lidegaard has also shortly described these initiatives as an illustration of the "poisonous threat scenarios" that existed in the late 1950s. Lidegaard, *I Kongens Navn*, p. 579.
[475] Villaume, *Allieret med Forbehold*, pp. 525, 542.
[476] "Lov nr. 342 af 23. december 1959 om civilt beredskab", FTT 1959-60 C, col. 73. The law was supported by all parties in the parliament aside from the communist party. Kaarsted, *De Danske Ministerier 1953-1972*, p. 141.

peacetime should also be in charge hereof during a crisis or a war. This principle has later been referred to as the 'sector responsibility principle'.[477] The law established a parliamentary committee to supervise the developments in civil preparedness planning and approve grants for concrete measures to be taken. From 1962, the responsibility of civil emergency planning, including the Secretariat for Civil Emergency Planning which has established to support the government committee in 1956, was transferred from the Prime Minister's Office to the Minister of Interior. The civil preparedness planning – as part of the total defence – was further developed through the 1960s, 1970s, and 1980s in interplay with a societal structure becoming increasingly complex, thereby necessitating, as Thomas Tram Pedersen has noted, a "holistic planning" in order to get different components of the society to interoperate.[478] The few historical examinations that have been carried out of the Danish total defence have generally accentuated the broadening of security responsibilities as part hereof: From military to civilian spheres, from the state to the individual, and – articulated with a 1985 amendment to the law on civil preparedness – from central to local municipalities.[479]

It was in the above described context that an increasingly advanced telecommunications preparedness governance evolved. In chapter three, I outlined how it became a topic for internal discussion in the telecom sector in the 1950s to what extent the tele administrations were obliged to establish circuits for defence purposes on certain conditions. In continuation hereof, other obligations in relation to security were also raised in the civil-military cooperation, both before and after the 1959 law. For instance, from the minutes of a meeting in the Defence Telegraph Administration in July 1958, in which representatives from the tele administrations participated, the following passage appears:

> The obligations that the telephone companies voluntarily have assumed as regards building, undertaking, and maintaining the telecommunications installations of the defence, and with the responsibility that these obligations are also valid under war circumstances, demand that the telephone companies in time consider, prepare, and test

[477] See Petersen and Jacobsen, "Totalforsvaret og det civile beredskab", p. 218.
[478] Pedersen, "Det totale forsvar til den totale krig", p. 18.
[479] For organisational aspects, see: ibid.; Petersen and Jacobsen, "Totalforsvaret og det civile beredskab"; Stevnsborg, *Magt, krig og centralisering*, p. 241ff. As for the individual aspect, Casper Sylvest has in a recent study stressed how Danish civil defence initiatives implied a transfer of security responsibility from the state to the individual: Sylvest, "Atomfrygten og Civilforsvaret". For similar Swedish perspectives, linking civil defence initiatives to welfare state developments, see Cronqvist, "Survival in the Welfare Cocoon"; Cronqvist, "Utrymning i folkhemmet".

> their organisations and estimate their preparedness with a view to an eventual wartime defence of Denmark. [...] The previous consideration that the telephone companies were wholly and fully civilian institutions with purely civilian purposes cannot be maintained. We are forced to admit that an eventual war is not a matter that is alone of concern to the actual defence organisations. It is an unpleasant idea and it can be difficult to admit or accept the impact that follows from a new problem in the daily dispositions and in the long-term planning, especially because it not alone pertains to the installations directly brought about for the defense, but also because it will be important for the telephone companies' civilian telephone facilities, buildings etc. well in advance to seek the greatest possible efficiency [of these facilities] during an eventual war." [480]

The minutes do not reveal to what extent this statement was a personal remark by one of the participants or a consensus of opinion among the participants. It appears likely that the statement came from the Defence Telegraph Administration, most probably from its chief colonel Jessen, and it is also the Defence Telegraph Administration and not the tele administrations that has conducted the minutes. Anyhow, the statement calls attention to the central issue related to preparedness planning in the area of telecommunications, namely that of negotiating the responsibility between the military and civilian stakeholders. It reveals, moreover, that the issues addressed by the government with the 1959 law on civil emergency planning were already discussed in the tele sector prior to this. This must be understood as a consequence of the development that I outlined in chapter three, namely the civil-military collaboration on the establishment of communications infrastructure for defence purposes in Denmark. The solution with common installations meant that both the challenge of protecting the telecommunications infrastructure and that of organising communications in wartime raised the problem of responsibility, as the tasks fell in between the usual civilian and military division of work. Moreover, as I show in this chapter, the discussion at the July 1958 meeting in the Defence Telegraph Administration also arose from different initiatives related to telecommunications security in NATO.

[480] Minutes of meeting in FTF, July 11 1958. 974A-1-31. EA.

5.1 Wartime communications

The first – and for my purpose the most comprehensive – problem that I shall examine is that of how communications should be managed in case of a war. This problem was discussed in the civil-military collaboration through the entire Cold War era. In wartime, the many circuits that had been prepared for military use would have to be coupled in, which would lessen the capacity in the networks for civilian purposes. The solving of this issue involved concerns for defence politics and civil preparedness politics as well as for technological and organisational developments in the area of telecommunications. In this section, I first show how the problem was negotiated between civil-military tele representatives through the 1950s, both in response to internal negotiations and to NATO initiatives. Further to this, I show how the problem of wartime prioritisation required political importance from the 1960s onwards, resulting in concrete political decisions on the military-civilian division of work in 1961-62 and 1975, and discuss the technopolitical dynamics hereof.

Priority to whom?

When examining the military-civilian discussions on how telecommunications should be managed in wartime, it appears that the central concern was that of network capacity. The question of how the capacity in the telecom networks should be allocated between civilian and military needs in case of a war was part of the negotiations between the defence and the telecom sector on establishing communications for defence purposes from the very beginning in 1950. In the following years, however, focus shifted towards more practical aspects of civil-military cooperation in wartime, as the holding of a number of exercises provided opportunities for rehearsing different procedures for how to manage wartime communications.

I have previously examined how the problem of network capacity was raised by the tele representatives in the early 1950s.[481] For instance, the director general of the P&T, KJ. Jensen, brought the matter up at a meeting in the Telephone Control Board in April 1950, arguing that in case of mobilisation the military would have a priority right to use the telephone network, but that "one should not forget that also civilian institutions needed their share, if everything should not break down". Jensen therefore found it necessary well in advance of such a situation to make clear plans for how to allocate telecommunication facilities.[482] Within the next couple of years, as shown in chapter three, plans for extending the circuits needed for military purposes were being prepared. At this point, the expectation in the sector was that when

[481] Jensen, *Klartone efter atombomben*, p. 46f.
[482] Minutes of TTS meeting, April 27 1950. TM, TTS, Tilsynets Møddereferater. RA.

these plans had been carried through, capacity would be sufficient. Until this was the case, however, the defence authorities stressed the need for a "priority right of the defence for telephone calls ordered through the civilian circuits" and referred to guidelines agreed on in NATO for military use of both international and domestic communication networks.[483] As outlined previously in this dissertation, similar issues were discussed in NATO at this point, leading to the establishment of the European Long Lines Agency (ELLA) in the summer of 1951. The tele administrations were however of the opinion that a priority arrangement would have major consequences for the civilian telephone traffic, and the directors of the three telephone companies agreed at a meeting in April 1953 that "a priority right shall only be given if the ministry [i.e. the Ministry of Public Works] comes with a demand hereof".[484]

The ministry did not issue such a demand. Instead, the problem of wartime distribution of network capacity was tested in practice in a number of NATO exercises carried through in the 1950s.[485] The first of the aforementioned signal exercises, SIGEX ONE, was held in Denmark in May 1954. It was planned by the Defence Telegraph Administration with the purpose of training the different authorities involved in wartime telecommunications management in the methods of work. This involved the establishment of a Danish NALLA.[486] NALLA – the National Long Lines Agency – was, as briefly described in chapter two, a national equivalent to the aforementioned European Long Lines Agency (ELLA) established by SHAPE in 1951. By 1954, ELLA had been assigned the task of operating in wartime too, but given the fact that the networks NATO's commands and agencies would need in wartime were national, the authority – and technical and personnel capacity – to couple in circuits and make dispositions over the network was also national. Consequently, ELLA's work relied fully on the

---

[483] Minutes of TTS meeting, March 1 1951. TM, TTS, Tilsynets Mødereferater. RA; Minutes of SU meeting, June 26 1952. TM, TTS, Bilag til samarbejdsudvalgets møder. RA.

[484] Minutes of meeting in De Samvirkende Telefonselskaber, April 24 1953. Unfiled. EA. The same message was repeated at meetings in the Coordination Committee, see for example: Minutes of SU meeting, August 28 1952, September 24 1953, October 29 1953, and September 30 1954. TM, TTS, Bilag til samarbejdsudvalgets møder. RA.

[485] NATO began holding signal exercises in the early 1950s, first as military exercises training forces from the alliance commands in wartime signal matters, later with participation of PTTs. See for instance mentioning of signal exercises for Allied Command Europe forces in 1952 and 1953: Note on Periodic report by the Supreme Allied Commander Europe no. 18, SG 120/18, July 23 1952. NA; Note on Periodic report by the Supreme Allied Commander Europe no. 19, SG 120/19, August 26 1952. NA; Note on Periodic report by the Supreme Allied Commander Europe no. 31, SG 120/31, August 18 1953. NA.

[486] AFNORTH final report on exercise SIGEX ONE, August 2 1954. ITTS, NALLA Denmark, Emneordnede Sager 1950-1985, 2. RA.

cooperation with the national agencies in charge of the networks.[487] It is likely in this connection that defence authorities in the member states began paying increased focus to their own wartime arrangements for communications. It appears from a 1957 briefing by ELLA that there existed "national organizations, which may be either military, civil, or 'mixed'" in all of the countries within ELLA's operating area that would manage circuits requirements in wartime.[488]

Thus, the establishment of a Danish NALLA was part of a broader manoeuvre in NATO. The Danish NALLA as of 1954 consisted of military representatives from NATO commands, military representatives from Denmark, and a civilian representative from the P&T.[489] Furthermore, in connection with NALLA, a special long lines office was established during the exercise with personnel from the tele administrations. A report worked out by the tele administrations after SIGEX ONE in May 1954 outlined how the collaboration had functioned: When the tele administrations identified damage in their networks, they informed the FTF about it, whereupon FTF submitted the incident to NALLA, which decided upon the priorities for rerouting the traffic. The decision by NALLA was then communicated to the four tele administrations through the FTF. The tele representatives concluded that this was "a rather slow procedure". Moreover, the tele administrations highlighted the fact that FTF during the exercise frequently had to consult the present tele representatives, "as the FTF-personnel does not possess – and probably cannot be expected to possess – the detailed knowledge, which is necessary in forming an opinion of the various matters." Instead, the tele representatives had been able to answer all the inquiries at once, based on their "expert knowledge, acquired during a number of years, of matters relating to long distance lines".[490]

---

[487] Note on Communications in Time of Emergency, June 4 1953. C-M(53)77. NA; Report on terms of reference for NATO communications agencies, May 10 1954. Enclosure to SG-28-2(Revised)(Final). NA.

[488] Summary of the ELLA briefing to the Committee, April 2 1957. AC/121-WP/1. NA. The available NATO material does not offer further insight into these national organisations, and further investigation hereof would require examinations in national archives. As I mentioned in chapter two, a document from the archives of the British Ministry of Defence reveals that the UK also established a NALLA in 1954, see: Memorandum on the United Kingdom National Long Lines Agency, November 28 1958, COS(58)265. DEFE 5/86. National Archives, UK.

[489] More specifically, the representatives were from: AFNORTH (the Allied Forces Northern Europe), AIRNORTH (the Allied Air Forces Northern Europe), COD DENMARK (the Chief of Defence), COMLANDDENMARK (the Commander Landforces Denmark), FO DENMARK (The Flag Officer Denmark), Air Commander DENMARK along with the FTF and the P&T. See: AFNORTH final report on exercise SIGEX ONE, August 2 1954. ITTS, NALLA Denmark, Emneordnede Sager 1950-1985, 2. RA; Minutes of SU meeting, January 14 1954. TM, TTS, Bilag til samarbejdsudvalgets møder. RA.

[490] Report on the exercise SIGEX ONE from the tele administration's representatives, May 12 1954. ITTS, NALLA Denmark, Emneordnede Sager 1950-1985, 2. RA.

In fact, in most cases the tele representatives had been able to reroute the circuits affected at once, rendering unnecessary a priority decision by NALLA.[491]

In 1955, after the first signal exercise had been held the year before, the Inter-ministerial Signal Committee (IMSK) stressed in a letter to the Ministry of Defence that it was of crucial importance that further exercises were held. IMSK had discussed the problems related to wartime communications with civil and military representatives and found that "a number of the problems unlikely could be settled with discussions and theoretical examinations alone, but should be clarified and worked through in practice". The IMSK chairman stressed that the functions to be carried out by NALLA in wartime were complicated but of "crucial and direct importance for the country's defence effort during war".[492] However, as the Inter-ministerial Signal Committee called attention to, the handling of telecommunications also raised a problem of principal matter. During wartime, the military needs for long line communications would be of such a considerable dimension that large parts of the long line facilities used for civilian purposes would have to be taken out of civilian operation and interconnected with the military network. Yet, as the IMSK chairman – the director general of the P&T – stressed, it was also necessary to maintain "the for the country most necessary civilian tele traffic".[493] The problem of prioritising between military and civilian communication needs in times of crisis gained new relevance in the following exercises, where representatives from "other civilian authorities of war importance" also began to participate – but problem remained unresolved.[494]

Yet, on a more practical level, the participation in the exercises by both military and civilian tele authorities brought along a number of experiences, as different constellations for military-civilian cooperation and the transition from peacetime to emergency circumstances were tested and evaluated. While SIGEX ONE was a Danish exercise only, the following exercises were part of wider NATO exercises and followed an exercise framework worked out by SHAPE. SIGEX TWO, for instance, which took place in all European NATO-countries in May 1956 began with the simulated attack by "EASTLANDIC forces" described in the beginning of this chapter. The

---

[491] AFNORTH final report on exercise SIGEX ONE, August 2 1954. ITTS, NALLA Denmark, Emneordnede Sager 1950-1985, 2. RA.

[492] Letter from IMSK to FM, June 9 1955. ITTS, NALLA Denmark, Emneordnede Sager 1950-1985, 2. RA.

[493] The IMSK therefore approached other central ministries and asked them to consider their wartime needs for communication facilities. See: Letter from IMSK to different ministries etc., October 26 1955. ITTS, NALLA Denmark, Emneordnede Sager 1950-1985, 2. RA.

[494] "Teleberedskabet og Databeredskabet", p. 1. IM, SCB, Sager vedr. det civile beredskab, 7. RA.

structure of the Danish telecom sector with the P&T and the three private companies meant that the knowledge about and administration of long lines were on several hands, which posed a challenge for effective wartime decisions. This challenge was also practical in character, as the telephone companies each had comprehensive card index systems filing their long lines and local circuits, for which reason the potential relocation to a wartime facility required a good deal of preparation.[495] Following SIGEX THREE held in November 1957, the Coordination Committee under the Telephone Control Board established a working group in order to find an arrangement for the wartime collaboration between the P&T, the telephone companies, and the FTF. The working group suggested that a wartime section of the long lines office under the P&T [fjernledningskontoret], also representing the companies, should be set up in connection with NALLA and, moreover, that an additional arrangement should be established in Jutland in the shape of an 'alternative' NALLA, ALTNALLA, with representatives from the P&T and JTAS.[496] The latter reflected the threat scenario that Copenhagen and the Eastern parts of Denmark would be attacked or occupied in case of a war, after which the alternative NALLA would take over the responsibility of the entire network.[497] A representative from the FTF later explained to colleagues in other NATO countries that FTF for this purpose

> "maintains duplicate records of all circuit requirements, and we have it so arranged that at any given time we have identical documentation here [in Copenhagen] and in Jutland. I need not mention why this is done."[498]

---

[495] See: Minutes of SU meetings, March 31 and April 28 1956. TM, TTS, Bilag til samarbejdsudvalgets møder. RA; Plan for Exercise SIGEX THREE (Danish Part of Exercise), November 6 1957.TM, TTS, Forsvarets Rationaliseringsudvalg 1956-1961, 1. RA.

[496] Report on guidelines for cooperation between the tele administrations and NALLA, February 1959. TTS, Udvalget til Reorganisering af Forsvarets Telekommunikationstjeneste 1956-1961. RA.

[497] An alternative NALLA, also called a Regional Long Lines Agency (RELLA), was tested for the first time in the SIGEX TWO exercise. For a discussion hereof on the Coordination Committee, see: Minutes of SU meeting, March 3 1955. TM, TTS, Bilag til samarbejdsudvalgets møder. RA. As the DIIS examination of Denmark during the Cold War revealed, the expectation in NATO's war scenarios at this point was that Denmark would be attacked from two fronts: a land attack on Jutland and a simultaneously air born attack on Eastern Denmark, primarily Zealand and Bornholm. However, the expectation was that Warsaw Pact resources for the Jutland attack were scarce and that the enemy would focus on conquering control over the Danish straits providing access to the Baltic Sea. DIIS, *Danmark under Den Kolde Krig*, I, p. 571ff.

[498] Lecture given by FTF, June 30 1960. ITTS, NALLA Denmark, Emneordnede Sager 1950-1985, 2. RA.

Moreover, at the initiative of the Coordination Committee, the working group was asked to work out very detailed instructions for how the collaboration in the long lines wartime office should proceed. In its report, submitted in February 1959, the working group went so far as to draw sketches of how the relocation office should be furnished and to make lists down to the slightest detail over the equipment and office supplies needed. Indeed, the latter is quite telling for how preparedness planning in the hands of the civilian tele administrations materialized in the greatest level of detail:

"

3 double writing desks
2 teleprinter desks for each 4 machines c. 5 x 0.9 m, height c. 65 cm
1 regular table c. 1 x 2 m
4 typewriter desks c. 0.4 x 0.5 m
6 table lamps
1 bookshelf c. 5.5 x 0.25 x 2 m
1 closet c. 1.5 x 0.5 x 2 m
1 bookshelf c. 2 x 0.5 x 2 m
1 bookshelf c. 1.75 x 0.5 x 0.75 m
10 chairs, hereof 4 with wheels
5 typewriters
5 desk pads
5 pen trays
5 blotters
5 rulers
5 bottles of office glue
8 trays or baskets for documents
and a suitable stock of:

paper in different formats
carbon paper
envelopes
glue stripes
coloured pencils
regular pencils
pencil sharpeners
ink
penholders
pens
clips
rubbers
blotting paper
letter files
perforators
charteques
wastepaper baskets

"[499]

[499] Enclosure no. 4, Report on guidelines for cooperation between the tele administrations and NALLA, February 1959. TTS, Udvalget til Reorganisering af Forsvarets Telekommunikationstjeneste 1956-1961. RA.

Thus, the involvement of the tele administrations in the exercise planning meant that the planning took a very practical form. These detailed preparations are significant, since neither the physical location nor the authority of NALLA had been settled at this point. One of the unsettled issues, which I shall get back to later in this chapter, was related to the question of how – and by the order of whom – a reduction of the regular civilian traffic in wartime should take place.[500] Another uncertain matter, which I shall address in chapter six, was what would happen to the civilian communications network, when all of the extra military circuits prepared for wartime were coupled in and taken in use. The working group established in order to find an arrangement for the wartime collaboration between the tele administrations and NALLA was specifically asked not to address these issues.[501]

Civil-military responsibilities

By the end of the 1950s, different practical matters related to the management of wartime communications had been tested. The problem of how to organise the collaboration between the military and civilian tele authorities in wartime now became a topic for political discussion, in Denmark as well as in other NATO countries. In June 1960, Denmark hosted a conference for Heads of NALLAs in Copenhagen. The FTF Chief, colonel Jessen, explained in an opening speech that the location of Denmark was chosen "as it is thought that development in the set-up of NALLA in this country is far advanced." Jessen therefore had as his ambition to:

> "make it clear why the various countries should establish thorough control of the communications network, so that when quick resolutions have to be made, it will always be possible for the tele network to give maximum satisfaction in any given situation, even in spite of destructions during war."[502]

On this occasion, another representative from the FTF, Mr. Pedersen, gave a lecture on how the Danish NALLA was organised. Pedersen referred to the "policy that no job which can be performed by a civil organisation in war and peace should be performed by a military one".[503] This was a reference to the

---

[500] See for instance: Note from the P&T on information to CCPC, April 22 1961. UM, Lukket Arkiv, 107.L.9. RA.
[501] Minutes of SU meeting, September 25 1958. TM, TTS, Bilag til samarbejdsudvalgets møder. RA.
[502] Opening speech by Colonel Jessen, June 30 1960. ITTS, NALLA Denmark, Emneordnede Sager 1950-1985, 2. RA.
[503] Lecture given by FTF, June 30 1960. ITTS, NALLA Denmark, Emneordnede Sager 1950-1985, 2. RA.

principle laid out with the 1959 law on civil emergency planning. Pedersen went on to describe the organisation of the Danish NALLA and stressed: "This means that our NALLA is not a military body; it is military and civilian combined."[504] By contrast, some of the NALLAs in other NATO countries were military organs, although these also drew upon the expertise of civilian tele technicians. This was for instance the case in Norway, where military communications were run by military authorities without civilian involvement, but where personnel from Telegrafverket also participated in NALLA exercises.[505] In his opening speech, Jessen had stressed that the advantage of the Danish organisation rested in the necessity "at any time during a war to be in absolute control of the distribution of all available telecommunications in order to solve any problem paramount at any moment". He moreover emphasised the need for "coordinated decisions for a mutual effort" without which the NATO countries' defence efforts would "disintegrate", while responsible authorities such as governments, civil authorities, the military forces, commercial organisations etc. would "loose every opportunity to maintain a regular NATO community".[506]

It is important to note that the NALLAs were national organs and that it was up to each country how such an organ should be organised.[507] It appears, however, that the Danish Defence Telegraph Administration used the occasion of the meeting in Copenhagen to promote the Danish arrangement. In his opening speech, Jessen stated:

> "The telecommunications of a country and inside NATO form, according to the Danish view by and large, an indivisible unit and the right to utilise it must, in certain circumstances, be allotted according to the merit of each individual case."[508]

---

[504] Ibid.
[505] Draft for a report concerning an examination of the Defence Telegraph Administration, August 1958. TTS, Forsvarets Rationaliseringsudvalg 1956-1961. RA.
[506] Opening speech by Colonel Jessen, June 30 1960. ITTS, NALLA Denmark, Emneordnede Sager 1950-1985, 2. RA.
[507] In an examination of the Danish police's participation in the total defence, Henrik Stevnsborg has interpreted the 1961 establishment of NALLA as a transfer of the administration of secure telephone systems in Denmark to be placed within the ambit of NATO, see: Stevnsborg, *Magt, krig og centralisering*, p. 257. It is necessary to note, however, that NALLA was under the responsibility of the Danish Ministry of Defence, and that in case of disagreement in the NALLA committee (in which NATO commands were represented), the chairman (in practice the chief of the Defence Telegraph Administration) had the final saying. Documents from NATO also stress that the NALLAs were to remain as national organisations. See for instance: Note by the CCPC secretary, June 10 1959. AC/121-D/45. NA.
[508] Opening speech by Colonel Jessen, June 30 1960. ITTS, NALLA Denmark, Emneordnede Sager 1950-1985, 2. RA.

Moreover, Jessen recalled that Denmark within NATO "has consistently emphasised" that the problem of satisfying the needs for wartime communications could be solved "only by placing the available telecommunications at the disposal of both civil and military authorities".[509] It appears, thus, that Jessen at this occasion attempted to further an agenda of civil-military cooperation on telecommunications. This is not least noteworthy given the increased focus on communications for solely military purposes in NATO at this point, as outlined in chapter four.

At this point, the system of the Danish NALLA as outlined by Jessen and Pedersen was not directly based on a governmental decision. Instead, it had been negotiated between the FTF and the civilian tele administrations based on experiences from the first three signal exercises, after which a proposal was forwarded to the Ministry of Defence. This resulted in a circular issued by the Ministry of Defence in July 1961 stating the terms of references for NALLA and ALTNALLA. NALLA would be established by the declaration of reinforced alert with the task of "ensuring the fastest possible handling of the tele traffic of both the military and civil defence in the common network driven by the tele administrations". This involved receiving and coordinating requests for circuits from civilian and military authorities and deciding how to meet these needs, if necessary by ordering a general reduction of the regular public traffic.[510] These decisions rested with the NALLA committee consisting of representatives from CINCNORTH (the Commander in chief of the Allied Forces Northern Europe), the Danish Chief of Defence, the Civil Defence, a representative from "other civilian authorities", as well as an appointed adviser from the tele administrations.[511] In case of disagreement in the NALLA committee, the chairman – the FTF Chief appointed by the Minister of Defence – was granted the last authority. In the aforementioned address given by Pedersen, he explained the reason for this:

> "A conflict will always be based on the fact that some circuits are very urgently needed, and that their number exceeds the capabilities. It will, therefore, always be better to have some of these circuits established rather than none, which would be the result if agreement could not be obtained."[512]

---

[509] Ibid.
[510] Circular on NALLA, Ministry of Defence, July 1961. 974A-2. EA.
[511] In addition, NALLA also had a subcommittee and a secretariat. The subcommittee was an executive organ consisting of liaison officers and civilian personnel from the different authorities represented in the committee, while the secretariat served the chairman.
[512] Lecture given by FTF, June 30 1960. ITTS, NALLA Denmark, Emneordnede Sager 1950-1985, 2. RA.

The formal establishment of NALLA in 1961 meant that the issue of authority as for the reduction of civilian traffic was settled, as NALLA was now given the authority to implement the destruction of civilian telecommunications in wartime. A further important thing to note about the formal establishment of NALLA is that it also involved that the Danish P&T would take over complete control of the Danish long lines, i.e. also the lines that in peacetime were controlled by the telephone companies. In wartime, thus, all Danish telecommunications would be managed from the wartime location of the P&T's long lines office, whether placed in the Eastern or Western part of the country, as the P&T was "granted the full authority to control the whole system and issue orders to stations normally in the hands of the Telephone Companies."[513]

In peacetime – and in between exercises – a secretariat in Defence Telegraph Administration took care of day-to-day NALLA businesses. However, as outlined in chapter three, the organisation – and future existence – of the Defence Telegraph Administration was up for discussion at this point. In November 1961, a committee established by the Ministry of Defence proposed that the responsibility of NALLA secretariat should be transferred to the P&T, while a signal department in the defence should only maintain the responsibility of some remains hereof, namely the military aspects of the engineering work and the control of defence spending on communications.[514] This proposal was met by the government and became effective as of July 1962. This meant that while the responsibility of NALLA overall served under the Ministry of Defence, the practical matters hereof were handled by the P&T. This involved receiving notifications on all the circuits needed for defence or civil defence purposes in wartime, as the member states according to ELLA procedures were obliged to ensure that such circuits were provided the most secure routing possible and to make plans for alternative routes for these circuits in case of destruction to the network. These circuits – which were for instance needed by the police forces, the Ministry of Foreign Affairs, the Civil Defence, or the civil administration – were either referred to as 'NALLA circuits', or, in the ELLA terminology, as 'vital circuits'. The idea was that the vital circuits of these authorities should be prioritised over the 'common-user' network, i.e. the regular subscribers.[515]

However, through the 1960s, the location of NALLA placed under the Ministry of Defence was questioned. This was occasioned by both

---

[513] Ibid.

[514] Report from the committee for reorganisation of the defence telecommunications service, November 9 1961. TM, TTS, Udvalget til Reorganisering af Forsvarets Telekommunikationstjeneste 1956-1961. RA.

[515] "Teleberedskabet og Databeredskabet". IM, SCB, Sager vedr. det civile beredskab, 7. RA.

technological and political developments. Technologically, the automation and large extension of the telecommunications networks that had taken place since the 1950s resulted in an increased complexity. After the P&T took over the assignments from the former FTF in 1962, including the peacetime secretariat functions of NALLA, this office gained increased expertise also in military circuit matters. Within NATO, Denmark accentuated the need for letting as much as possible of wartime cooperation on telecommunications be handled by the national P&Ts. In 1964, for instance, the Danish representative in CCPC stressed that instead of involving NATO, it was "a natural PTT task" to enter bilateral agreements on establishing tele type networks for crisis situations between the different national long lines agencies.[516] On the basis of exercises, the NALLA committee also experienced that its basis for decision-making in wartime increasingly rested on close technical consultations. NALLA therefore found it desirable to integrate the expertise of the P&T long line office closer into the NALLA wartime procedures.[517]

Politically, concerns for both defence politics and civil preparedness played a role. Similar to the developments in the 1950s described in chapter three leading to the closure of the Defence Telegraph Administration, a 'rationalisation' exercise of the Danish defence was initiated in the late 1960s. This was part of a broader effort to reorganise the Danish defence, culminating in 1969 with the passing of a new law on the defence organisation calling for the joining of the Defence Staff with the different commands within the Danish defence in a common command, the Defence Command Denmark [Forsvarskommandoen].[518] In relation with the rationalisation exercise, the Ministry of Defence initiated a "special rationalisation examination" of the signal department of the Danish defence and a further examination of how NALLA should be organised in the future in response to the structural changes of the defence.[519] The latter was carried out by a working group consisting of representatives from the Ministry of Defence, the Defence Staff, the P&T, and

---

[516] Danish minutes of CCPC meeting April 1964, May 1 1964. UM, Lukket Arkiv, 107.L.9. RA.

[517] During a November 1967 exercise named BABY BOUNCER, NALLA tested a new working procedure in which the P&T and the NALLA secretariat was essentially integrated. See: Letter from NALLA chairman to the tele administrations, January 31 1969; Extract from minutes of meeting in working group on NALLA, May 26 1971 ITTS, NALLA Denmark, Journalsager, 1, 10. RA.

[518] The purpose of the reorganisation was to rationalise the defence, but the idea also rooted in a political wish for a closer cooperation between the different commands and a relocation of defence sections from Copenhagen. The process was first initiated by the prime minister Jens Otto Krag in 1967, and carried out by the government led by Hilmar Baunsgaard from 1968 in which the conservative Erik Ninn-Hansen served as defence minister. Heurlin, "Forsvarskommandoen", p. 268f.

[519] Letter from FM to SCB etc., December 12 1967. IM, SCB, Sager vedr. det civile beredskab, 7; Letter from FM to IM etc., January 21, 1969. ITTS, NALLA Denmark, Journalsager, 1, 10. RA.

the Secretariat for Civil Emergency Planning. It appears from a report submitted in August 1971 that the members of the working group disagree strongly on NALLA's future affiliation: The civilian representatives favoured a proposal to transfer the responsibility of NALLA to the Ministry of Public Works, while the defence representatives argued that NALLA should continue to resort under the Ministry of Defence.[520] From a military point of view, the Defence Command found it "very necessary" that NALLA remained under the Ministry of Defence, as this solution would best provide for the defence interests given the fact that military communications were mainly provided through the networks owned by the tele administrations.[521]

However, the Secretariat for Civil Emergency Planning also played an important role in this process. The need for transferring NALLA to the Ministry of Public Works had at first been raised in the negotiations by the representative from the Secretariat for Civil Emergency Planning. This was done with reference to the 1959 law on civil emergency planning and the aforementioned 'sector responsibility principle'. Stressing this principle, the Secretariat for Civil Emergency Planning questioned the current organisation, arguing that the Ministry of Defence was actually solving tasks that came within the sphere of the Ministry of Public Works.[522] As it had been the case in the late 1950s, the P&T was at first not keen on taking over the responsibility of NALLA. However, upon the proposal from the Secretariat for Civil Emergency Planning, the P&T agreed that this could help integrate peacetime tasks of NALLA with other telecommunication matters.[523] The government became involved in the dispute in 1972. In February that year, the Minister of Public works, the social democrat Jens Kampmann, argued in a letter to his colleague in the Ministry of Defence, social democrat Kjeld Olesen, that the NALLA responsibility should be transferred to his ministry. He referred to the aim expressed in the law of civil emergency planning that the specific ministers should be in charge of organising the preparedness measures within their own operating area.[524]

---

[520] Letter from FM to NALLA chairman etc., September 9 1971. ITTS, NALLA Denmark, Indgående skrivelser, 3. RA.
[521] Letter from FKO to FM, November 19 1970, letter from FM to FKO, November 27 1970, Letter from FKO to FM, December 10 1971, ITTS, NALLA Denmark, Indgående skrivelser, 3. RA.
[522] "Teleberedskabet og Databeredskabet", p. 2. IM, SCB, Sager vedr. det civile beredskab, 7. RA. According to the memoirs of Per Heikel Vinther, who was part of the negotiations himself, the Secretariat for Civil Emergency Planning stood very firm on the principle of sector responsibility.
[523] Letter from FM to NALLA chairman etc., September 9 1971. ITTS, NALLA Denmark, Indgående skrivelser, 3; "Teleberedskabet og Databeredskabet" p. 2. IM, SCB, Sager vedr. det civile beredskab, 7.
[524] Letter from MOA to FM, February 8 1972. ITTS, NALLA Denmark, Journalsager, 1, 10. RA.

Upon these discussions, the Ministry of Defence asked the Inter-Ministerial Signal Committee (IMSK) to review the issue. IMSK was in the beginning of the 1970s composed in such a way that representatives appointed by the Minister of Defence constituted a minority.[525] IMSK decided to recommend to the government that NALLA was transferred to the Ministry of Public Works, a recommendation eventually accepted by the Ministry of Defence.[526] The recommendation was met by the Prime Minister's Office in July 1975 and became effective as of August 1 1975.[527] When presenting the proposal to the Prime Minister's Office, IMSK highlighted that placing NALLA under the Ministry of Public Works would best facilitate the transition from peacetime to wartime.[528]

It is noteworthy that in the above described process, no references to NATO or to particular alliance obligations were made. Both the political and sector-specific considerations, civilian as well as military, took their point of departure in the Danish context, and the proposal by IMSK outlined how the framework set up in ALLA enabled different organisational arrangements on a national level.[529] The 1975 reorganisation of NALLA involved two important changes. First, the responsibility of NALLA was transferred from the Ministry of Defence to the Ministry of Public Works, more specifically to the General Directorate of the P&T. As a result, the P&T now took over the chairmanship of the NALLA committee – and thereby obtained the final saying in case of disagreement in the committee. Second, the peacetime activities of NALLA were strengthened in the way that a 'core' of the NALLA secretariat would also be working on a daily basis. In this way, the planning for a wartime activation of NALLA was prepared on an ongoing basis. This arrangement was thought to allow for "both the peacetime and wartime functions and in particular the transitional phase", and thereby ensure continuity between the management of Danish telecommunications networks in peace and in war.[530]

---

[525] Four representatives were appointed by the Minister of Public Works, three by the Minister of Defence, and on by the Secretariat of Civil Emergency Planning. See: Letter from FM to different authorities, May 15 1973. ITTS, NALLA Denmark, Indgående skrivelser, 4. RA.

[526] Report by the working group on NALLA set up by IMSK, January 3 1974. ITTS, NALLA Denmark, Journalsager, 1, 10. RA.

[527] Letter from FM to NALLA chairman etc., July 23 1975. ITTS, NALLA Denmark, Indgående skrivelser, 4. RA.

[528] The letter to the Prime Minister's Office was summarised in: Letter from FM to MOA etc., June 23 1975. ITTS, NALLA Denmark, Indgående skrivelser, 4. RA.

[529] Report by the working group on NALLA set up by IMSK, January 3 1974. ITTS, NALLA Denmark, Journalsager, 1, 10. RA.

[530] In addition, NALLA's subcommittee and committee were merged in order to simplify the wartime procedures. Letter from FM to MOA etc., June 23 1975. ITTS, NALLA Denmark, Journalsager, 1, 10. RA.

From 1975 until the end of the Cold War period, NALLA was under the jurisdiction of the Ministry of Public Works and placed in the General Directorate of the P&T. In this period, NALLA's peacetime work mainly revolved around the organisation of circuits into larger groups, as the significant increase in the total number of circuits to be managed by NALLA rendered impossible the previous individual circuit management.[531] The NALLA secretariat also worked out a forehand priority arrangement for these groups of circuits needed for the total defence. This meant that more decisions as regards the prioritisation of circuits in case of network damages were made already in peacetime, thereby reducing the number of priority decisions necessary to make in wartime.[532]

It is important to note that this development did not mean that all communications were in civilian hands. Military communications remained in military hands, and in the 1970s and 1980s, the Danish defence authorities developed an advanced, integrated system for internal communications, Forsvarets Integrerede Kommunikations System (FIKS). Moreover, the Danish Defend Command was the responsible authority for the planning and implementation of the Danish part of the NATO Integrated Communications System (NICS) project.[533] In wartime, all the users – i.e. the total defence authorities using the circuits - were represented in the NALLA committee in which they negotiated order of priorities in case of damage on networks and lessened capacity.[534]

To sum up, the development as regards the responsibility for wartime planning in the area of telecommunications went from resting mainly with military authorities in the 1950 over a period in the 1960s when more responsibility was transferred to the telecom sector to the decision in 1975 to

---

[531] In general, however, the share of NALLA circuits in the entire Danish communications network had decreased significantly, as civilian communications has grown in large numbers. See: Summary of meeting September 26 1977, the NALLA secretariat. ITTS, NALLA Denmark, Journalsager, 1, 10. RA. See also: Note on a draft for the organisation of certain working processes, April 21 1977. ITTS, NALLA Denmark, Journalsager, 2, 12. RA; Note on the gathering of total defence important circuits in special groups, enclosure no. 2 to summary of meeting September 26 1977, the NALLA secretariat. ITTS, NALLA Denmark, Journalsager, 1, 10. RA.

[532] "Teleberedskabet og Databeredskabet", p. 2f. IM, SCB, Sager vedr. det civile beredskab, 7. RA.

[533] By 1977, the Danish participation in NICS involved one SATCOM earth station, two ACE High stations, and one secure voice central with i.a. the Ministry of Foreign Affairs and the Defence command as subscribers. Moreover, plans were made for two access switches and one telegraph automatic relay equipment. Note by FKO on NICS, June 1977. ITTS, NALLA Denmark, Journalsager, 9, 46C. RA. For more on Danish defence communications systems in the Cold War, see Christensen, *Fra morsenøgle til datanet.*

[534] Orientation of P&T station leaders, enclosure no. 1 to summary of of meeting September 26 1977, the NALLA secretariat. ITTS, NALLA Denmark, Journalsager, 1, 10. RA.

of ascribing the main responsibility hereof to the P&T. The area of communications thus echoes the political will expressed in the 1950 law on civil emergency planning that the authority in charge of an area in peacetime should also be responsible hereof in wartime.

5.2 Prioritising essential traffic

One of the security measures that could be taken in use in case of a war or a crisis was an arrangement worked out in the telephone sector to prioritise the most 'essential' traffic over less essential traffic. As I showed in the last section, the question of how essential traffic – and what kind of traffic that was in fact essential – was discussed among civilian and military representatives in the cooperation on communications in the early 1950s. In this section, I examine the concrete technical and political steps taken in order to implement a priority arrangement.

The authority of the state to limit the regular telephone and telegram traffic was settled by the Ministry of Public Works.[535] During the Second World War, a measure for limiting traffic in the Danish telephone network was implemented in the shape of a ban for making telephone calls during air strike warnings and immediately after such warnings. This was done in order to make sure that the most essential traffic could be upheld in critical situations.[536] After the establishment of the Inter-Ministerial Signal Committee (IMSK) in 1953, the committee took up the issue of the priority system and revisited the Second World War arrangement. In June 1954, IMSK arranged for a list to be prepared of subscribers that should be ascribed the possibility of making telephone calls during air strike warnings [flyvervarsel].[537] In case of an air strike warning, a number of local urban exchange centrals in the most exposed areas, e.g. in the largest cities, had established emergency centrals in basements or other secure locations from where the operational personnel could continue their work – in case the exchange central kept working.[538]

The making of the preference system

From 1954 to 1957 – in the same period where the Defence Telegraph Administration with help from the tele administrations began practicing

[535] It appears from a 1979 background note from NALLA that the ministry issued the first notice defining the conditions for imposing a limitation of traffic in 1928. See: Note by NALLA on limitation of public telegram traffic, February 1979. ITTS, NALLA Denmark, Journalsager, 18, 94. RA.
[536] Note by IMSK, August 31 1957. ITTS, NALLA Denmark, Journalsager, 18, 94. RA.
[537] Letter to different ministries from IMSK, December 23 1957. ITTS, NALLA Denmark, Journalsager, 18, 94. RA.
[538] Note from the chief telegraph inspector, November 29 1956. ITTS, NALLA Denmark, Journalsager, 18, 94. RA.

wartime communications management in the signal exercises – IMSK considered how a future priority arrangement could be established. In September 1957, the director general of the P&T and chairman in IMSK, KJ Jensen, informed the Coordination Committee that this was "a burning and crucial question, one of the most important in IMSK" and emphasised how it was deplorable that an arrangement was still – twelve years after the last war – not worked out.[539] At this point, however, in 1957, two things had changed.

On the one hand, the need for such an arrangement had been broadened. As an August 1957 note by IMSK outlined:

> "The measures that must be taken will not alone come into play during air strike warning, as it can be anticipated that in the period before an eventual outbreak of a war and during a war or in a period without actual fighting very likely will occur situations putting such a large pressure on the telephone facilities that a limitation of the access to the use [hereof] will be necessary in order to carry through the essential and defence necessary traffic."[540]

Although no direct references were made to NATO's call for increased focus on the mobilisation period or to the work in the Danish government's committee established in December 1956 to work with civil emergency planning, it seems very likely that the broadened focus in IMSK was connected with these developments.

On the other hand, the broadened focus also appears to have been brought about by technological developments. The automation process meant that local telephone exchanges, which hitherto had not been planned to be in operation during air strike warnings, now could continue the operation that did not require personnel in such situations. It was necessary, however, to construct a system making sure that too many calls would not be made at the same time. For this purpose, IMSK agreed on the estimation that the technical circumstances allowed 5% of the total number of subscribers at a local exchange to be given such a possibility. Thus, the subscribers would have to be divided into two categories: A privileged group with full possibilities for making calls and another group with the rest of the subscribers which, when necessitated by the circumstances, could be cut off from making calls. These subscribers, however, could still receive calls from prioritized callers.[541]

---

[539] Minutes of SU meeting, September 26 1957. TM, TTS, Bilag til samarbejdsudvalgets møder. RA.
[540] Note by IMSK, August 31 1957. ITTS, NALLA Denmark, Journalsager, 18, 94. RA.
[541] Note by IMSK, August 31 1957. ITTS, NALLA Denmark, Journalsager, 18, 94. RA; Note by IMSK, December 23 1957. ITTS, NALLA Denmark, Journalsager, 18, 94. RA.

The 5% was only an estimation. It had been worked out on the basis of the aforementioned 50% figure rule in NATO and by calculating which consequences the expected lessening of capacity – and further lessening caused by damages – would have for the network. The defence representatives in IMSK and the Coordination Committee noted that the tele administrations were essentially the only ones who could figure out how such a solution would actually work, both as regards the technical installations and the administration hereof.[542] The 5% arrangement was referred to as the "blockade system" ["blokeringsordningen"] and involved that, upon an order to implement it, all regular subscribers were shut out from making telephone calls, while all the prioritized users maintained the possibility to do so. Both the defence and the tele representatives however called into question the status of the remaining 95% of the subscribers. Colonel Jessen noted that out of consideration for "the psychological defence", there also had to exist an opportunity for regular subscribers to get through in critical situations – "even if they would have to put up with queuing". Steenbuch, now the director of the telephone company KTAS, added that it could also be perceived as an encroachment of the rights of the regular subscribers if they were completely shut off from communicating in 'preparedness situations'.[543]

While the question of when the blockade system could be implemented continued to be a matter of discussion in IMSK, the tele administrations, who were put in charge of managing the system, began collecting information from relevant ministries on which total defence authorities that needed to be included in the five per cent – for instance the vital parts of the press corps.[544] Moreover, as the lists of prioritised users at certain exchange centrals began approaching the estimated maximum of five per cent, the Government Committee on Civil Emergency Planning issued a circular in October 1958 setting the rules for how to choose the secure telephones.[545] The IMSK and the Government Committee on Civil Emergency Planning asked the tele administrations to go forward with the implementation of the system – but also to explore other technical possibilities for implementing a priority system.[546] Accordingly, a working group with technical experts from the tele administrations began looking into the technical possibilities for making a

---

[542] Minutes of SU meeting, September 26 1957. TM, TTS, Bilag til samarbejdsudvalgets møder. RA.
[543] Ibid.
[544] Letter to different ministries from IMSK, December 23 1957. ITTS, NALLA Denmark, Journalsager, 18, 94. RA; Note by the P&T, April 2 1958. ITTS, NALLA Denmark, Journalsager, 18, 94. RA. For the press corps' access to communications in critical situations, see Jensen, *Klartone efter atombomben*.
[545] Letter from RUCB til ministries etc., October 15 1958. ITTS, NALLA Denmark, Journalsager, 18, 94. RA.
[546] Ibid.

different type of arrangement, which instead of cutting off non-prioritised traffic would make a preference to the prioritised traffic.[547] Again, it was the technical development towards automation that made such an arrangement possible, a system established already in peacetime to give prioritised subscribers a 'preference' in the telephone network – i.e. a dial tone ahead of other users – thereby rendering less necessary the need for cutting all other subscriber's access in case of a crisis.[548]

Upon the establishment of the Civil Communications Planning Committee in NATO, the need for developing national priority systems was also discussed among the NATO allies. In a 1959 reply to CCPC, the Government Committee for Civil Emergency Planning described the state of the Danish plans:

> "At most exchanges the number of telephone subscribers with vital functions is between 5 and 10% of the total number of subscribers, and it is therefore endeavoured to carry out arrangements to make it possible to confine the access to the network of the other 90 – 95% of the subscribers. In this connection either blocking arrangements may be topical so that the blocked subscribers are debarred from calling themselves, however, so that the possibility of calling them is preserved, or priority calls from the subscribers with vital functions are accompanied by a special signal which, if the called number is engaged causes non-priority connections to be broken off so that the priority call can be established. Provisional lists of subscribers with vital functions have already been prepared, but as the implementing of the arrangements will necessitate rather considerable investments, the work must be presumed to be extended over a rather great number of years."[549]

The technical measures that needed to be taken for implementing this 'preference system' were negotiated between the tele administrations, the IMSK, and the Secretariat for Civil Emergency Planning in the early 1960s. They became part of the '60 million kroner' plan, which I shall explore further

---

[547] Report from committee regarding a method to ensure essential telephone traffic, ATU doc. no. 212c, November 1958. TTS, TU, Dokumenter 1935-1962, 9. RA.
[548] Note by KTAS, March 1969. ITTS, NALLA Denmark, Journalsager, 18, 94. RA. The tele administrations therefore began communicating with tele operators on how such a system could be established from a technical point of view. See for instance: Letter from the P&T to Standard Electric A/S, November 21 1960. ITTS, NALLA Denmark, Journalsager, 18, 94. RA.
[549] Reply by RUCB to Information Request No. 97, no date 1959. UM, Lukket Arkiv, 107.L.9. RA.

in the next section. The tele administrations moreover agreed that the public telephone boxes should be part of the preference system, so that they would also be available for public telephone traffic in case of a crisis.[550] The preference system – also referred to as the 'A system' – was implemented in different stages through the 1960s. In practice, the blockade system – referred to as the 'B system' – was also maintained, so that the cutting off of all non-prioritised traffic in wartime remained a possibility.[551] As I outlined in the last section, the NALLA committee was ascribed the authority to implement the blockade system in wartime. The preference system, by contrast, was a permanent system also functional in peacetime. In this way, the prioritised callers would always be given priority, also under normal circumstances. This opened for the possibility, as a 1969 note made by KTAS summarised, for "a possible postponement of the moment for the implementation of the more the drastic blockade".[552]

In this way, the development as regards this specific security measure in the telephone network of prioritising the most essential traffic went in the direction of having more measures implemented already in peacetime. A further example hereof is the extension of the possibility to implement the blockade system in peacetime too – i.e. in situations where NALLA was not activated. In a 1968 note from IMSK, it figures that the committee had

> "noticed that during disasters in peacetime it can be of importance for the different civilian helplines that similar measures are taken for limiting the telephone traffic in order to ensure that the authorities participating in the rescue work – that are already appointed part of the 5% prioritised subscribers – have the best possible access to making telephone calls."[553]

In the following years, IMSK discussed the question of in which situations a blocking of non-prioritised subscribers could be implemented. Eventually, in 1973, the committee agreed with the Ministry of Defence, the Ministry of Interior, the Ministry of Justice, the Ministry of Public Works and a number of other authorities such as the telephone companies that local chief constables in the police should be given the authority to request the telephone

[550] Minutes of SU meetings, September 28 1961, January 25 1962, February 22 1962. TM, TTS, Bilag til samarbejdsudvalgets møder. RA.
[551] Note to from the preparedness group under the TCB, SO doc. no. 510, September 20 1967. ITTS, NALLA Denmark, Journalsager, 18, 94. RA.
[552] Note by KTAS, March 1969. ITTS, NALLA Denmark, Journalsager, 18, 94. RA.
[553] Draft note by IMSK, November 1968. ITTS, NALLA Denmark, Journalsager, 18, 94. RA.

administrations to implement the blockade system in local areas in peacetime.[554]

In the 1980s, the matter was taken up again as a preparedness planning group under the Telephone Control Board proposed that tele administrations themselves should be given the authority to impose the limitation on traffic instead of the local chief constables who had "no knowledge about the traffic situation in the telephone network".[555] This idea was taken up by the National Board on Telecommunications [Statens Teleråd] – the successor of the Telephone Control Board – who suggested to the other involved authorities that the tele administrations should be given the authority to impose a limitation on traffic when they identified overloading of their networks, e.g. in case of severe accidents, natural disasters, or other extraordinary crisis situations in peacetime.[556] Upon negotiations with the other authorities, the National Board on Telecommunications however reached the conclusion that the authority to impose traffic restrictions should remain with the police authorities, on the basis of an assessment of the traffic situation made by the tele administrations.[557]

Overall, the two arrangements for prioritising essential traffic and limiting non-essential traffic were referred to as the 'securing system' [sikringsordningen]. They remained in existence throughout the Cold War period – and beyond. The emergence and development of this system reflects a shift in focus through the Cold War period. Once established, the initiatives launched in the 1950s in order to plan for the maintenance of the society in wartime and linked with the initiatives in NATO to promote national civil emergency planning were broadened to include more scenarios than what had been the case from the outset. As more responsibility was transferred to civilian spheres, such security measures came to mark a continuity between peacetime and wartime. From both a political and a technical point of view, the 'securing system' also became a way of building more security measures into peacetime communications and pre-empt scenarios of breakdown and traffic overload. In this way, wartime planning evolved to be a broader discipline, also aiming at different potential peacetime disasters or emergencies.

---

[554] Letter from IMSK to FM etc., June 25 1973. ITTS, NALLA Denmark, Journalsager, 18, 94. RA.

[555] Yearly report from the preparedness group for 1981, July 13 1982. ITTS, NALLA Denmark, Journalsager, 12, 52. RA.

[556] Letter from MOA to Statens Teleråd, May 9 1985. ITTS, NALLA Denmark, Journalsager, 18, 94. RA. I shall get back to the establishment of Statens Teleråd in chapter six.

[557] Letter from KTAS to the Minister of Communications, October 15 1987. ITTS, NALLA Denmark, Journalsager, 18, 94. RA.

5.3 Nuclear-proof communications facilities?

I now turn my focus to another central issue in the civil-military cooperation on telecommunications security, namely that of physical protection of the communication facilities. The challenge of protecting the communication facilities in Denmark had both a peacetime and a wartime dimension. In wartime, the protection of vital communications facilities was part of the overall plans for the protection of the aforementioned 'key points' – sites of particular strategic importance that should be defended by branches of the Home Guard in case of an emergency.[558] Moreover, the vital role played by telecommunications in case of a crisis the tele administrations were allowed to have at their disposal the personnel which were otherwise obliged to join the military services in case of mobilisation.[559]

In this section, I shall concentrate on the steps taken in peacetime to improve the material security of Danish telecommunications, including the aforementioned 60 million kroner plan, with the aim of examining the technological and political visions behind these measures. The course of events in this case is similar to that of the previous sections, since the problem of physical security was first raised in the telecom sector in the early 1950s, whereupon initiatives in NATO towards the end of the decade necessitated political decision-making in Denmark. I look into these developments in the first part of this section and then move on to the further implementation of security measures from 1960 onwards.

Identifying vulnerability

The question of how the communications facilities could be physically protected was brought up by both civilian and military representatives, when the plans for extending military communications facilities building on top of the existing civilian network were drafted from 1950 onwards. I have shown in a previous examination how these concerns about the vulnerability of the telecom installations all referred to bombing or sabotage.[560] The 1952

---

[558] For more on the Danish management of 'key points' – which also included around 1500 public telephone boxes – see Stenak et al. eds., *Kold Krig*, p. 40; Laursen, *Politiets Efterretningstjeneste 1945-1968*, p. 140ff., 172ff.; Schmidt, *PET's Overvågning af Arbejdsmarkedet 1945-1989*, p. 99f. For the NATO background, see Report by the Committee on Civil Organization in Time of War, January 4 1955, C-M(55)4. NA.
A special branch of the Home Guard, 'Telehjemmeværnet' had as its task in wartime to help secure the public telephone facilities against enemy destruction. See: Report on 'Telehjemmeværnet', June 1976. ITTS, NALLA Denmark, Journalsager, 12, 57. RA.

[559] This was part of the so-called designation system [designeringsordningen]. See: Ibid.

[560] Jensen, *Klartone efter atombomben*, p. 52f. For instance, at the April 1951 meeting in the Ministry of Public Works, Steenbuch, the chairman of the Telephone Control Board, noted that the public telephone installations were "extremely vulnerable to

establishment of the Defence Telegraph Administration (FTF) gave this administration the responsibility of ensuring that the communication facilities to be used for defence purposes were "designed in the most appropriate way" and "replaceable in case of destructions".[561] It remained a topic for discussion for some years how the communication facilities, the existing ones as well as the new ones being constructed, would best be protected against future enemy attacks.[562]

It was for instance brought up in the fall of 1955 with the case from Slagelse with which I began the introduction to this dissertation. This appears to be the first time the prospect of an atomic attack was brought into the discussion. As recalled, the plans for a new building for the exchange central in Slagelse was problematised by colonel Jessen at a meeting in the Coordination Committee in October 1955. On that occasion, the KTAS director responded that when proposing new buildings and installations, the telephone company considered its own interests only and argued that if the defence authorities wanted better security measures to be taken, they could offer to pay for the extra costs. However, Jessen strongly disagreed that the costs for implementing such security measures should be held by the defence, arguing that under the existing circumstances, the entire society should get ready to solve "these problems" if it had to survive an attack-related crisis.[563] Moreover, Jessen called attention to an article he had written in the Danish technical journal *Ingeniøren*. In the article, Jessen referred to what he perceived as a duty resting on the concessionary company "under all conditions to ensure the carrying through of the traffic without blockades". He argued that the companies already when projecting new facilities had to make considerations for how best to "anticipate the situations that could occur during war conditions".[564]

Besides disagreeing on the responsibility for taking security measures, the civilian and military stakeholders moreover had very different perceptions of security. This is evident when taking a closer look at Jessen's article in *Ingeniøren*, from which it appears how Jessen, who also served as Denmark's member in the European Long Lines Agency (ELLA), was influenced by the strong focus on the nuclear threat in NATO. As outlined in chapter four, the adoption of the nuclear strategy in NATO in late 1954 brought about a change

---

bombing and sabotage" and called attention to the problem that the communication facilities due to their particular vulnerability easily would become military targets. See: Minutes of meeting in the Ministry of Public Works, April 25 1951. 974A-1-27, EA.

[561] Announcement for the defence B.17-1952, FM, April 26 1952. 974A-1. EA.

[562] See for instance Minutes of SU meeting, January 1 and June 26 1952. TM, TTS, Bilag til samarbejdsudvalgets møder. RA.

[563] Minutes of SU meeting, October 27 1955. TM, TTS, Bilag til samarbejdsudvalgets møder. RA.

[564] Jessen, "Nogle betragtninger vedrørende fremføringsveje for permanente telekommunikationer".

in the fundamental view upon which the preparedness planning was based, articulated in the May 1955 decision by the North Atlantic Council that the committees working on civil emergency planning should "proceed henceforth on the assumption that nuclear weapons would be used" in a future war. The document approved by the Council moreover stated that "[e]very country will have to interpret the agreed assumptions to fit its own particular circumstances and take preparatory measures accordingly".[565] This decision was based on a proposal by Ismay in which he outlined potential priority targets for a future enemy attack, including, among others, centres of government, communication centres directly supporting the war effort, centres of population.[566] Jessen outlined in his article how it from a military point of view was wrong that long line cables for telecommunications were routed through cities, since war experiences had generally shown how enemies made large efforts to destroy the opponent's cities. In order to stress his point about the problem of cities, Jessen made a historical reference to the autobahns build in Nazi Germany, which had exactly been constructed in the way that they bypassed urban areas in order to secure their maintenance even after air attacks on German cities.[567]

The further course of the process of securing communication facilities in Denmark serves as an example of how the NATO membership came to serve as a catalyst for developments in Danish telecommunications.[568] The aforementioned list of potential targets worked out by NATO's Senior Civil Emergency Planning Committee in May 1956 included "cities or areas which are regarded as possible hydrogen bomb targets". In Denmark, the list pointed towards Copenhagen as a possible target, while the whole country except the Northern tip of Jutland was expected to be affected by fallout. A later corrigendum from February 1957 also added Aarhus to the list of potential targets.[569] Upon the establishment of the Civil Communications Planning Committee in early 1957, the member states were asked in April 1957 to report on their plans for overcoming potential shortages in communications expected to occur in wartime due to reductions of network capacity, taking their point of view in the expected targets, which in most cases were also the location of vital communication nodes.[570] This request was part of the new kind of security

---

[565] Note on the application of the new assumptions, May 27 1955. C-M(55)48(Final). NA.
[566] Note on further assumptions for civil emergency planning, January 19 1955. C-M(55)8. NA.
[567] Jessen, "Nogle betragtninger vedrørende fremføringsveje for permanente telekommunikationer", p. 848.
[568] I have made this argument previously, but it is necessary to further expand on it in this section. See Jensen, *Klartone efter atombomben*, p. 52ff.
[569] Note on assumptions for civil emergency planning, May 2 1956. AC/98-D/14(Final); Corrigendum 2 to AC/98-D/14(Final), February 15 1957. NA.
[570] Questionnaire for the 1957 Annual Progress Review, April 11 1957. AC/121-D/5. NA.

governance introduced in NATO's civilian preparedness agencies in 1957 with the exercise of introducing annual progress reports.

Whereas the civilian tele administrations had not taken particular notice of the nuclear threat when brought up in the case of Slagelse, they were now compelled to think along those lines. In May 1957, the P&T was asked by the Ministry of Foreign Affairs to provide a reply to the April 1957 request by the CCPC.[571] In June, the P&T sent a reply to the Ministry of Foreign Affairs and in July an updated reply in which an attack on Aarhus was also taken into consideration.[572] Two things appear from reply: The expectation towards damages on the Danish communication networks in case of an enemy attack and a status of the steps already taken and plans prepared in order to overcome this. As regard destruction, the expectation was that upon an attack on a city with nuclear weapons, repeater stations, telephone exchanges, and tele printer exchanges in the city in question were assumed to be so badly damaged that they would be unusable. This meant that if Copenhagen were to be attacked, the telephone, telegram, and telex traffic between areas east and west of the Great Belt would be interrupted, the capacity of traffic in the Eastern Denmark reduced, and as for the transnational connections, most telephone, all telex, and an essential part of the telegram traffic would be interrupted. If Aarhus was attacked, a total interruption of the telephone, telegram, and telex traffic from the area north and west of Aarhus to the rest of the country as well as of the majority of the traffic to Norway were expected to occur.[573] As regards the necessary steps to be taken to overcome this, the P&T estimated that in order to re-establish the network, the national as well as transnational connections, it would be necessary to acquire more repeater stations and establish possibilities for terminating the central cable along a western-eastern line in the country (Copenhagen-Odense-Kolding-Esbjerg) somewhere on Zealand outside of Copenhagen. Moreover, it would be necessary to establish a ring cable around Aarhus and to upgrade a number of automated centrals so that they could take over transit traffic from centrals in Copenhagen and Aarhus.[574]

The ring cable solution is noteworthy, since a similar proposal had been brought up a few years before, in June 1952, when the defence authorities and civilian tele administrations first began discussing the problem of vulnerability. In this context, a working group with representatives from the civilian administrations found that establishing ring cables around the larger Danish cities would be an unfit and too costly solution. Against this, liaison Jessen

---

571 Note on letter sent to the P&T, May 4 1957. UM, Lukket Arkiv, 107.L.9. RA.
572 Note from P&T on information to CCPC, June 6 1957; Note from P&T on information to CCPC, July 4 1957. UM, Lukket Arkiv, 107.L.9. RA.
573 Note from P&T on information to CCPC, July 4 1957. UM, Lukket Arkiv, 107.L.9. RA.
574 Ibid.

argued that this point of view was "at odds with the understanding in NATO".[575] Thus, the idea of bypassing large urban areas was not a product of the nuclear security agenda. Instead, it appears that the support for implementing such measures changed. In the reply sent to NATO in the summer of 1957, the Danish P&T estimated that completing the suggested work would amount to a cost around 7 million Danish kroner. The document noted that the Danish government had discussed how to implement the measures, but not yet reached a solution. In particular, a challenge was posed by the fact that the security measures would not only affect the installations of the Danish P&T but also, to a large extent, installations which were common to the P&T and the telephone companies as well as installations which were the sole property of the telephone companies.[576]

The Danish reply was, along with replies from other member states, included in an August 1957 report made by the CCPC. In general, the main problem of telecommunications security at this point seems to be that of bypassing cities. The nuclear threat, in other words, was translated into a concrete challenge related to how the national infrastructure was constructed. A comparison of the national replies however shows that the interpretation of the nuclear threat differed. For instance, whereas the reply from Belgium stressed that "there is no long-line communications network whkch [sic!] could not be paralysed by thermonuclear and atomic attack on the major communications centres" in Belgium, the French reply stated that "[u]nderground long distance cables, at a depth of 80 cm. alongside roads, are impervious to blast", but only vulnerable to a direct zero point hit by an atomic or thermonuclear bomb.[577] In noticing this difference, one must keep in mind that the French and Belgian cases differed in terms of for instance urban density and network redundancy. However, the August 1957 CCPC report reveals how the perception of the nuclear threat was shaped in a national context, for instance on the basis of exercises in which NATO had provided the overall framework, e.g. how heavy an atomic bomb to explode at a specific target, but where the consequences hereof were calculated by national personnel.

Moreover, a comparison of the national replies also reveals that the national plans for overcoming this challenge differed according to geopolitical circumstances and to how national telecom sectors were organised. In France, for instance, large investments had been made in the communications infrastructure as part of the early stages of the common infrastructure programme in WUDO and NATO, and the French reply therefore stressed

---

[575] Minutes of SU meeting, June 26 1952. TM, TTS, Bilag til samarbejdsudvalgets møder. RA.
[576] Ibid.
[577] Replies for 1957 annual review, Annex I (Belgium) and Annex XII (France), August 9 1957. AC/121-D/9. NA.

how these extensions of the national network has overall made French telecommunications less vulnerable to destruction.[578] In the Federal Republic of Germany, by contrast, a NATO member since 1955 and accordingly not part of the early stages of the common infrastructure programme, the Deutsches Bundespost was fully responsible for the maintenance of telecommunication services both in peacetime and wartime. The expectation by Deutsches Bundespost was that thermonuclear or nuclear attacks on towns or other expected target areas "would widely paralyse telecommunications services both within the Federal Republic of Germany and with other countries", since most communication links either terminated or transited potential target areas. Similar to Denmark, Germany therefore had plans of constructing cables bypassing cities, auxiliary facilities, and emergency exchanges, but the provision of the necessary funds had been brought to a close.[579]

In the United States, telecommunications were in private hands, and the long-distance telephone network in the country was operated by the American Telephone and Telegraph Company (AT&T). A July 1957 report outlining the state of national civil communications planning in the United States stresses how the law required "common carriers to furnish service in the public interest," for which reason the plans for overcoming shortages in communications facilities in case of wartime destruction rested mainly with AT&T. The report to NATO outlined how AT&T had "embarked upon a project of constructing trunk routes across the country, by-passing critical target cities and other important centers." These plans, scheduled to cost approximately $100 million were being financed by AT&T alone without government assistance.[580] The case of AT&T's preparedness measures supports a point made by David Reynolds of a 'contract' between AT&T and the government that the company in return for being granted monopoly-like privileges by the state served national security interests.[581] However, it also appears from the report that AT&T's project had not only been undertaken to assure the integrity of the national network in war, but also "to take care of the rapid growth and dispersion in telecommunications in the present high level

[578] Replies for 1957 annual review, Annex XII (France), August 9 1957. AC/121-D/9. NA.
[579] Replies for 1957 annual review, Annex IV (Germany), August 9 1957. AC/121-D/9. NA.
[580] Report by the United States on National Civil Communications Planning, July 1 1957. AC/121-D/7. NA.
[581] Reynolds has argued that AT&T's "effective monopoly" in the light of the general anti-trust atmosphere in the United States must be understood as "the result of the Pentagon's need for a single organisation [...] that was at the beck and call of the US government." See: "Reynolds, "Science, technology, and the Cold War", p. 390.

economy."[582] As such, the preparedness measures were also an important supply to AT&T's network – a supply that was needed in any case.

In Denmark, the American plans served as inspiration for the FTF Chief Jessen. In a second article published in *Ingeniøren*, now in November 1957, Jessen referred the preparedness planning that had been carried out by AT&T and emphasised the "eagerness" with which the private company had embarked upon the task of securing national communications in the United States. In the eyes of Jessen, AT&T's efforts should served as a prime example for other private actors in telecommunications.[583] Moreover, he included a translation he had done himself of an article written by the Director of Operations in AT&T's Long Lines Department, James E. Dingman. In the article, which had been published in an American journal a few months before, the following passage appears:

> "The nuclear family of weapons, with their awesome potential for destruction and devastation, has introduced scores of new problems to the overall job of maintaining communications. They have, in fact, brought a new dimension to the task of planning and constructing communication plants. The Bell System has an answer [..] We have launched – and have half completed – the construction of new facilities that will enable us to maintain communications across the length and breadth of the country in the face even of severe, large scale attacks with nuclear weapons."[584]

An interesting point in relation to Dingman's statement is that only a few years after, AT&T's telephone network in the United States was accentuated as a particular vulnerable spot in terms of a nuclear strike on the United States. This was one of the factors leading Paul Baran, a researcher at the US think tank RAND, to propose a new way or organising communications networks as distributed instead of centralised.[585]

---

[582] Report by the United States on National Civil Communications Planning, July 1 1957. AC/121-D/7. NA.
[583] Jessen, "Nogle betragtninger vedrørende fremføringsveje for permanente telekommunikationer".
[584] Dingman, "Communications in the Nuclear Age", p. 7f. Dingman's article was brought in a June 1957 edition of the journal SIGNAL published by the Armed Forces Communications Association. The Bell System was the system of companies to which AT&T belonged. For Jessen's Danish translation, see: Jessen, "Nogle betragtninger vedrørende fremføringsveje for permanente telekommunikationer".
[585] Ryan, *A History of the Internet*, p. 13f. For Baran's memorandum, first published in 1962, see: *On Distributed Communications* Memorandum MR-34-20-PR (1964).

Clearly, for a private business like AT&T, there were interests at stake in relation to these preparedness investments, both as regards the state and the customers. In chapter six, I shall return to the discussion about the responsibility – and self-interest – of private actors to participate in national security planning. As for now, the point about bringing these different national approaches into the picture is to show how, when translated into a national context, different aspects of NATO's common recommendations could be articulated nationally and used as a catalyst for change in the sectors. When returning the attention to Denmark, it appears that the particular focus in SCEPC and CCPC on the vulnerability of larger cities – in the Danish case Copenhagen and Aarhus – came to serve as a catalyst for further development. Prior to this, as outlined above, the problem had been raised on few occasions in the tele sector, but the sector's awareness had generally revolved around more 'comprehensible' problems than that of the nuclear threat. In the fall of 1956, the Coordination Committee had established two working groups to study problems related to physical security, one with the purpose of working out guidelines for new buildings, one to study the possibilities for 'error recoveries' in the case of destruction of parts of the telecommunications networks in wartime.[586]

The request from NATO's civil communication agency became a motive force for new initiatives. Upon the reply sent to CCPC in the summer of 1957, the P&T was asked by the Government Committee for Civil Emergency Planning in February 1958 to elaborate on the plans, after which the government committee discussed the issue again and, in October 1958, informed the P&T that the finance committee of the Parliament had approved the allocation of an amount of 7.9 million kroner to carry into effect the proposed security measures for bypassing Copenhagen and Aarhus, which involved the construction of a number of spare plants.[587] In continuation

---

[586] Minutes of SU meetings, September 25 1956, November 29 1956, and May 23 1957. TM, TTS, Bilag til samarbejdsudvalgets møder. RA; Report from the committee on error recovery, May 1957. ITTS, NALLA Denmark, Emneordnede Sager 1950-1985, 1. RA. The working group on physical guidelines planned to visit to Sweden, the Netherlands, and Belgium in order to learn about experiences from these countries.

[587] Note on the securing of telecommunications facilities, February 20 1958. 930A-6. EA; Letter from the Government Committee for Civil Emergency Planning, October 13 1958. 930A-6. EA; Reply by RUCB to Information Request No. 97, no date 1959. UM, Lukket Arkiv, 107.L.9. RA. It appears from the report by Per Heikel Vinther that the government committee first discussed the security of telecommunication facilities at a meeting in January 1958 and then again in April and August 1958 – although Vinther's different reports are not completely consistent. See: "Den centrale, generelle planlægning.", p. 17f. IM, SCB, Sager vedr. det civile beredskab, 5. RA; "Teleberedskabet og Databeredskabet", p. 1f. IM, SCB, Sager vedr. det civile beredskab, 7. RA. A further examination of the government's position on the plans for securing the telecommunications infrastructures would require studies of the records of the Government Committee for Civil Emergency Planning. These records are subject to

hereof, representatives from the Ministry of Defence, the defence, the Civil Defence, and the P&T were invited to a meeting at the end of October in the Ministry of Interior hosted by the ministry's permanent secretary, Zeuthen, who was also heading the Secretariat for Civil Emergency Planning. Here, the P&T was asked to begin the implementation of the 7.9 million kroner plan – aside from the proposed ring cable around Aarhus, which was no longer found urgent after a project involving the construction of radio links as part of NATO's infrastructure programme had also come into the picture.[588] The fact that the planned security measures had been occasioned by NATO was stressed at a meeting in the Telephone Control Board in February 1959 at which the chairman referred to "facilities that at the instance of NATO are presupposed established for the use of telephone traffic in case of Copenhagen's or Aarhus' destruction."[589]

The '60 million kroner plan'

However, the political awareness about the problems of telecommunications security at this point was not limited to the 7.9 million kroner plan. Proposals for similar construction works such as a ring cable around Copenhagen were discussed at the October 1958 meeting, where Zeuthen also referred to a "wish list" of future projects made by the Inter-Ministerial Signal Committee.[590] In November 1958, the Coordination Committee was asked by the IMSK to decide upon an order of priority of the different elements included on the 'wish list'. In total, the implementation of these measures were estimated to amount to a cost of 60 million kroner, the procurement of which was negotiated in the government and in IMSK. Both the tele administrations and Jessen agreed that all of the listed measures were necessary, and Jessen noted that in fact "no prioritisation should be made", but recognized, however, that "the conditions forced this through".[591]

Besides the spare plants to secure the telephone and the telex traffic upon the destruction of Copenhagen and Aarhus, the 'wish list' contained measures

---

a 60 years non-disclosure rule and will therefore likely become available for researchers before long.

[588] Minutes from meeting October 30 1958. IM, SCB, Sager vedr. det civile beredskab, 7, Dokumentation. RA.

[589] Minutes of TTS meeting, February 5 1959. TM, TTS, Tilsynets Mødereferater. RA.

[590] Minutes from meeting October 30 1958. IM, SCB, Sager vedr. det civile beredskab, 7, Dokumentation. RA. Further examination of IMSK's records could give insights into how IMSK had worked with the topic of physical security prior to the 1957 request from CCPC. It appears that IMSK already had discussed a number of concrete projects desirable to be undertaken at this point. Unfortunately, however, as mentioned in a footnote in chapter three, I have not been able to identify IMSK records besides those documents also placed in the records of other authorities.

[591] Minutes of SU meeting, November 27 1958. TM, TTS, Bilag til samarbejdsudvalgets møder. RA.

needed for blocking non-vital telephone traffic; mobile units to replace destroyed repeater stations and cable stretches; spare plants for the supply of current in order to secure the operation of telephone exchanges and networks; physical protection of repeater stations, telephone exchanges and radio installations; and magneto emergency switchboards to replace destroyed automatic telephone exchanges. In a 1959 reply to a request from NATO, the Government Committee for Civil Emergency Planning emphasised how these different security measures had been worked out "with a view to the total defence". Moreover, the government committee informed NATO that it at that point "not [was] possible to estimate what further credits will be devoted during 1959 and the following years".[592]

In the beginning of 1961, the government granted a loan to the telephone companies of 25 million kroner in order to carry the first stage of the needed measures through.[593] The fact that the amount was provided as a loan and not a grant like the 7.9 million kroner plan mentioned above appears to be in line with the principles laid out in the law on civil emergency planning, but the available source material does not allow me to explore the political reasoning behind this decision in more detail.[594] The plan was later referred to as "an order to the tele administrations".[595] Moreover, a later letter from the Ministry of Interior to the Ministry of Public Works described how the amount of the loan could be raised when necessary.[596] In September 1961, the Coordination Committee of the Telephone Control Board made a schedule for how the different elements should be implemented. By request of the Secretariat for Civil Emergency Planning, the technical measures related to implementation of the priority system were brought forward.[597] The plan continued to be referred to as the '60 million kroner plan' and was implemented by the tele administrations through the 1960s. A special committee on preparedness issues established by the Telephone Control Board followed the implementation of the plan and drew up a "telecommunications preparedness plan" [Teleberedskabsplanen], which was upgraded and updated on an

---

[592] Reply by RUCB to Information Request No. 97, no date 1959. UM, Lukket Arkiv, 107.L.9. RA.
[593] Transcript of letter to the telephone companies, May 4 1961, and Minutes of SU meeting, July 3 1961. TM, TTS, Bilag til samarbejdsudvalgets møder; Letter from IM to MOA, April 14 1967. TTS, Rådighedskredsløb. RA.
[594] Source material from the Government Committee on Civil Emergency Planning and its secretariat will probably be able to shed more light on this in the future.
[595] Status report from the special committee on preparedness issues, March 1 1967. TTS, SU, Dokumenter 1962-1982, 9. RA.
[596] Letter from IM to MOA, April 14 1967. TTS, Rådighedskredsløb. RA.
[597] Letter from SCB, July 6 1962. TM, TTS, SU Sager, 5, 9. RA.

continual basis.[598] When the special committee reported on the status of the plan in 1967, it stressed that besides the preparedness measures included in the 60 million kroner plan, the political decision behind the plan also ascribed the tele administrations with the responsibility of "including considerations for preparedness issues in all planning", i.e. also the future facilities that the tele administrations planned to construct.[599] Therefore, besides overseeing the implementation of the 60 million kroner plan, the special committee also began studying protective measures in a broader perspective. This involved a "duty to follow the development abroad", for which reason the committee began corresponding with P&Ts in other countries on security standards for telecommunications facilities.[600]

When studying the issues discussed in the special committee on preparedness issues through the 1960s and 1970s, it appears that the focus shifted away from the nuclear threat scenarios that had been dominant in the 1950s and early 1960s. This can, on the one hand, be understood in the light of the period of détente that emerged in the East-West relations in the 1960s and in the increased transfer of Cold War tensions to areas outside of Europe, beginning with the Cuban Missile Crisis of 1962.[601] On the other hand, it also appears to be a deliberate choice taken by the tele administrations. When future preparedness initiatives were discussed at a meeting in the Coordination Committee in September 1963, the members agreed that further physical measures should principally be of such a character that they had a value in peacetime too. This could for instance be the acquisition of more reserve power supplies, which could also be taken in use in case of power failures. In justifying this decision, the chairman of the Coordination Committee argued that although "the importance of the tele network is large in particular in the initial phases of a war", it was necessary also to address the question of necessary preparedness measures "in the light of what had been done in other areas, and that was not much." The chairman stressed that a functional telephone network would be of no importance "if everything else was destroyed".[602] This statement is an indication that the tele administrations at this point, in 1963 – after the closure of the Defence Telegraph Administration and the transfer of NALLA's peacetime tasks to the P&T – had gained increased freedom in terms of defining the scope and content of preparedness measures within their area of operation. Measures for which they also had to pay

[598] See for instance: Minutes of SO meeting, September 12 1973. TM, TTS, Møddereferater. RA. The special committee on preparedness issues was first named 'Beskyttelsesgruppen' and from 1963 'Beredskabsgruppen'.
[599] Status report from the special committee on preparedness issues, March 1 1967. TTS, SU, Dokumenter 1962-1982, 9. RA.
[600] Letter to the technical committee, May 13 1963. TM, TTS, SU Sager, 5, 9. RA.
[601] Villaume, "Den Kolde Krigs Historie", p. 34f.
[602] Minutes of SO meeting, September 19 1963. TM, TTS, Møddereferater. RA.

themselves. In this way, the purpose of preparedness initiatives was increasingly broadened with the consequence that the "daily operational reliability" of the telecommunications infrastructure in Denmark improved in general.[603]

5.4 Border-crossing links

A fourth and last case that I shall delve into is the special concerns that revolved around border-crossing links. The problem of the international connections linking Denmark up with other NATO allies as well as neutral states and Warsaw pact member states found expression in different ways, but I shall concentrate on one specific case in the following, namely the telex network.

Historically, as different studies of telecommunications history have shown, the transnational junctions have posed great troubles for nation states, not least in times of crisis. This has caused governments to introduce special security measures, usually in the shape of some kind of censorship.[604] For NATO, the challenge of transnational junctions in wartime seems to have been twofold. On the one hand, it rested in the desire to uphold international communications across the entire territory of the alliance. As evident from chapter four, the effective functioning of the alliance in wartime, e.g. the nuclear command and control apparatus, relied on effective communications. For this purpose, the great majority of infrastructure construction that was embarked upon by the allies had to do with transnational links. Moreover, the effective coordination of international communications in wartime was the primary focus of ELLA. When studying the material from the signal exercises carried out through the entire Cold War period, it also appears that the interruption of transnational links was regarded as a crucial thing to practice by the exercise planners. This was for instance the case in the 1956 SIGEX TWO that I referred to in the beginning of this chapter.

On the other hand, there was also the problem of external communications. A growing amount of telecommunications links connected NATO countries with neutral and enemy countries. In peacetime, these links were not problematic, but if a crisis broke out, a potential problem was constituted by the fact that the technological and political borders did not align. This issue was of particular relevance for the telex networks of reasons that I shall now elaborate on. Essentially, it was a national decision how to deal with the networks in wartime, and the introduction of special regulations rested on bilateral negotiations.

---

[603] This point was for instance underlined by a head of delegation in the Civil Defence Board in an article published in 1980: Andersen, "Teleberedskab", p. 22.
[604] See for instance Jackson et al., "Understanding Infrastructure", p. 4f.; Marklund "Trawling the Wires".

The problem of transnational telex links in wartime

The term 'telex' is abbreviated from 'tele printer exchange', and refers to a network of connected tele printers providing instantaneous telecommunications in the form of direct text-written messages between a sender and a receiver. Tele printer services gained ground in the United States and North-Western Europe in the interwar period and soon became an important means of transnational communications, not least in the years after the Second World War, where the international connectivity improved markedly.[605] In contrast to earlier forms of telegraphy, telex machines did not require specialist skills to operate. The telex service was a subscriber service and primarily used by businesses, news agencies, and governmental authorities. Being cheaper than long-distance telephony, the telex network fulfilled a requirement for communicating over long distances by quick transmissions. Furthermore, written communications were in many situations perceived as more authoritative – and highly desirable for cross-border communications in Europe due to the language differences.[606] Telex services therefore constituted the most important means for transnational communications in Western Europe for most of the Cold War period.[607] An important post-war development was the introduction of the international standard of 'gentex' – general telex. The gentex system was a permanently connected network made up of telegraph offices, switching centres, and telegraph channels, interconnecting the offices to switching centres and the switching centres to each other.[608]

---

[605] The first network of tele printer machines was a private news network installed in the UK around 1920. In the US, the teletypewriter exchange service (TWX) was introduced by AT&T in 1931. Germany installed the first public automatic tele printer network in 1932 and began international telex operation with the Netherlands and Switzerland in 1934 and a few years after with Belgium, Denmark, and the UK. After being interrupted during the war, international telex services were resumed, extended, and automated in the early post-war years. See: Lous, "Telegraf 1920-74", p. 236f.; Blüdnikow, *Post og Tele under samme tag*, p. 51f.; Huurdeman, *The Worldwide History of Telecommunications*, pp. 142, 300, 510f.

[606] For instance, a 1963 brochure from the Danish P&T demonstrates how the telex services were promoted with a reference to the international connectivity they provided. Moreover, the brochure claimed that telex "combines the speed of the telephone with the authority of the written word" and that misunderstandings were avoided, since both sender and receiver had a copy of the same text "spelled out in black and white". Brochure on Telex, P&T, 1963. Unfiled. EA.

[607] By the late 1950s, Denmark's international telex traffic to other European countries exceeded international telephony. See for instance, Johansen, *Fra monopol til konkurrence*, p. 63; Blüdnikow, *Post og Tele under samme tag*, p. 51f.

[608] The term "gentex" was adopted at a CCIT assembly in December 1956, and the assembly agreed upon the operational rules and principles for the service as well as standards for signals for fully automatic switching. ITU, "CCITT 50 Years 1956-2006", p. 9.

In NATO, upon the establishment of the Civil Communicaitons Planning Committee, one of the challenges that caught the attention of this committee was the telex and gentex networks within NATO's territory. Due to the vital role that the systems played for communications between national authorities and for transnational communications, the maintenance of the telex network in a crisis situation was desirable but also a challenge with regards to both security policy considerations and the technological design of the networks. The telex issue was raised for the first time in 1958, when CCPC asked the member states to give their view on whether it would be desirable to maintain telex communications in case of a crisis of war. The Danish reply was affirmative:

> "As a considerable part of the telex subscribers are public institutions, i.e. the military defence, the civil defence and the police, and larger industry and business companies, the Danish authorities consider it important for the effectiveness of the total defence that both the national and the international telex service be continued in wartime."[609]

Similar replies came from other countries, which caused the CCPC at different occasions in the following years to recommend that it was "necessary" or "essential" to maintain the telex and gentex services in wartime. In doing so, CCPC referred to the fast nature of these communication means and the "economic method" they provided for meeting wartime communication needs of e.g. national governmental authorities.[610] It appears from minutes from a 1964 CCPC meeting that it was in particular the smaller European countries in NATO that stressed the need for upholding telex communications in wartime. This was done with reference to the need for transnational communications between PTTs and NALLAs in which these countries besides their own language also had to correspond in English and French.[611]

However, maintaining international telex and gentex traffic among the NATO allies in wartime also posed problems. One problem rested in the infrastructural layout of the telex system that had built up in Europe since the interwar period, as the system connected capitals and larger cities – i.e. potential target areas according to the framework adopted by the Senior Civil Emergency Planning Committee.[612] In Denmark, the telex network, which was

---

[609] Danish reply to AC/121-N/15, December 18 1959. AC/121-D/67. NA.
[610] 1960 yearly review of civil emergency planning, September 30 1960. AC/98-D/104; 1965 Progress Report by CCPC, November 4 1965. AC/121-D/130; Report by SCPEC, October 1 1968. C-M(68)46. NA.
[611] Danish minutes of CCPC meeting April 1964, May 1 1964. UM, Lukket Arkiv, 107.L.9. RA.
[612] Note by the secretary, July 24 1961. AC/121-D/71(Rev1). NA.

fully automatic, was operated by the P&T and build up around Copenhagen as the main nodal point, for which reason almost all domestic traffic and all transnational traffic transited centrals in Copenhagen. Accordingly, considerations for the vulnerability of telex communications were part of the general considerations for communications and potential target areas made in the late 1950s. In 1959, Denmark reported to the CCPC about plans for making extensions of the telex exchanges in smaller towns and preparing a redistribution to these exchanges of the subscribers normally connected to the telex exchanges in the areas pointed out as potential bombing targets, Copenhagen and Aarhus. Furthermore, in order to uphold international telex communications, one of these smaller telex exchanges was expected to be supplied with equipment for connection of international circuits on a manual basis.[613] These security measures were part of the 7.9 and 60 million kroner plans presented in the previous section.

By way of comparison, a report by the CCPC chairman from September 1959 indicates that other allies, e.g. Italy and Norway, had similar plans for meeting international requirements by means of switching central locations.[614] By contrast, some allies found it unlikely that the system could be protected and maintained in wartime. The UK, for instance, reported to the CCPC in 1967 that since all the country's telex switching centres and most of the subscribers were located in the larger cities, British authorities did not plan on relying on the telex system for essential communications in wartime, and no arrangements for maintaining the system were contemplated in the UK.[615]

A further concern in Denmark was the expected increase in traffic likely to occur in times of crisis. The Danish network was at this point fully automatic and consisted of users that could be divided into three groups: Telegraph stations (providing the public telegram traffic over the telex network); the police, defence, and civil defence; and finally private telex subscribers. A note made by the Inter-Ministerial Signal Committee in 1959 outlined how in particular the security authorities would use telex traffic to a greater extent "under special circumstances". Moreover, the fact that the regular telephone traffic would perhaps be limited in such a situation would also cause a decrease in the regular public telegram traffic.[616] An extension of the capacity for both domestic and international telex traffic was therefore considered.[617]

---

[613] Second Danish reply to AC/121-N/5, May 26 1959. AC/121-D/49. NA; Note by the P&T on reply to AC/121-N/5 and AC/121-R/2, April 21 1959. UM, Lukket Arkiv, 107.L.9. RA.
[614] Report by CCPC, September 22 1959. AC/98-D/88. NA.
[615] Note by the Technical Adviser, July 26 1967. AC/121-N/155. NA.
[616] Note by IMSK, June 25 1959. ITTS, NALLA Denmark, Journalsager, 18, 94. RA.
[617] Memorandum by the P&T on a possible extension of the telex network, June 1959. ITTS, NALLA Denmark, Journalsager, 18, 94. RA.

The extension of the international telex capacity was however dependent on a second problem, namely on what conditions telex communications could take place in wartime. As noted, the international telex networks linked NATO allies up with both neutral and enemy countries. By example, in 1959 the Danish telex traffic to other countries amounted to around 500 calls in the "main traffic hour", of which 250 were automated calls to Germany, 150 were manual calls to other NATO countries, 20 were automated calls to non-NATO countries and 80 manual calls to non-NATO countries.[618] A matter of concern for both alliance-internal and alliance-external telex communications in wartime was that of censorship. Previous research has shown how it prior to the Cold War had been a customary practice for states to introduce censorship on transnational communications in wartime.[619]

In 1958, CCPC therefore asked the national delegations for their view on this matter. Denmark informed the CCPC that the country had not yet opened up for bilateral negotiations on the maintenance or suspension of the international telex service "under special conditions", since rules for censorship and proper safeguards against abuses yet remained to be settled by the government.[620] The Danish delegation added that whether or not international intra-NATO connections could be upheld in a crisis situation depended on a decision as to what extent – if any – the telex traffic in wartime should be under control.[621] As for communications security, in other words, the government had not yet adapted to the new security political circumstances. The same appears to be the case for the other NATO allies.[622]

In CCPC, the delegations therefore agreed to undertake a study of the issue. The problem was that traffic would be considerably delayed – and the network therefore of limited value – if the member states did not implement a censorship agreement. In 1964, an agreement was reached on a common guidance on censorship in wartime that all nations had to apply with.[623] According to this, the ambition was that NATO's continental European territory (i.e. not including the US, the UK, Canada and Iceland) from the point of view of censorship should be regarded as a monolithic bloc within which communications would not be censored.[624] However, the common policy on this area was only vaguely defined. As the 1965 progress report of the CCPC summarized, "traffic between gentex offices in member countries will not be

[618] Ibid.
[619] See for instance Marklund "Trawling the Wires".
[620] Danish reply to AC/121-N/5, December 18 1958. AC/121-D/35. NA.
[621] Danish reply to AC/121-N/15, December 18 1959. AC/121-D/67. NA.
[622] Report by CCPC for 1963, September 11 1963. AC/98-D/173. NA.
[623] 1964 Progress report by CCPC, October 12 1964. AC/98-D/192. NA.
[624] Report by SCPEC, October 1 1968. C-M(68)46. NA.

subject to censorship unless a specific country so decides."[625] In other words, the ability to control communications remained in the hands of the nation state.

Finally, there was also the problem of neutral and enemy countries. In case of emergency, communications with enemy countries would have to be suspended, the CCPC concluded in 1965. But then what about communications with or transiting through neutral countries? The general opinion of the CCPC was that in case of war, relations with neutral countries should be maintained and done so at least with the same traffic handling capacity as in peacetime. This was due to the fact that a bigger traffic load was expected in case of a crisis, a traffic load that could not easily be replaced by another system. In the particular case of the gentex service, CCPC found it necessary to retain the gentex links with neutral countries "for staff and operational reasons".[626]

However, the links to neutral countries was also problematized in several ways. First of all, there existed international cable circuits between NATO member countries which passed through a non-NATO country. This involved the risk of inter-allied communications being monitored by non-aligned. CCPC concluded that such communications within the alliance should be banned and that these routes would have to be re-routed wholly within the NATO area. On the contrary, there were also examples of traffic between neutral countries that transited through NATO's continental European area. This traffic, it was decided by CCPC in 1965, should be maintained and monitored. Second, the fact that most telex traffic to neutral countries was automated was also articulated as problematic. Automatic services did not hold in them the 'control level' of a human operator, and this lack of control-element raised security concerns. By 1968, Western European telex traffic was largely handled by fully-automatic operation, and the general opinion of CCPC was that this mode of operation should as far as possible be retained in an emergency and in wartime. Yet, as it was argued, the problem was that telex traffic between allies and neutral states in a crisis situation would have to be monitored in its entirely in order to prevent unauthorised information from leaving the continental NATO area. Therefore, automated traffic would have to be discontinued. Another problem with neutral countries was the lack of control in further interconnections. For instance, it was problematized that Austria offered automatic transit to East Germany, Czechoslovakia, Hungary.[627]

Again, it is important to note that the settling of this issue was eventually up to national governments. From the available source material from CCPC and other NATO communication agencies, it does not appear to be the case

[625] 1965 Progress Report by CCPC, November 4 1965. AC/121-D/130. NA.
[626] Ibid.
[627] Ibid.; Report by SCPEC, October 1 1968. C-M(68)46. NA.

that the NATO allies reached an agreement on the censorship issue. This is however a topic that needs further exploration – also on a national level.

In Denmark, a new and extended telex network was implemented in the early 1970s. In contrast to the previous network, the new one would have two equally large transit and international centrals placed in Copenhagen and Kolding, thereby building more flexibility and, thus, security into the network. A 1968 note by the P&T outlined how, with this design, "the greatest possible considerations [had been made] in order to be able to carry through telex traffic without important inconvenience under special circumstances".[628] Moreover, the new network design allowed for the grouping of the subscribers into different classes that could be separated from each other in the way that subscribers not belonging to the same class could not communicate. This opened up the possibility for establishing closed, classified networks, e.g. for defence purposes. As for the question of censorship, the 1968 note made by the P&T contains a number of handwritten notes that appear to have been added in 1969. According to these, the amount of transnational telex traffic between Denmark and other NATO-countries as well as non-allies had at this point, i.e. in the late 1960s, grown significantly, for which reason it was no longer practically possible to impose a general censorship on telex traffic. Instead, other measures for limiting the telex traffic would have to be taken in use in wartime if deemed necessary.[629]

Concluding remarks

In this chapter, I have delved into different aspects of preparations for wartime in Danish telecommunications through the Cold War period. The purpose of doing so has been to examine how the prospect of nuclear war and the total preparedness agenda translated into concrete undertakings in the telecom sector.

My examinations of the different cases reveal a general trend, namely that in the early 1950s, many problems related to wartime security were raised in the civil-military cooperation on telecommunications established in response to the increased military demands for communications facilities caused by the NATO membership. Next, from the mid-late 1950s, when the NATO allies began working more focussed on civil emergency planning, a number of initiatives and issues found their way from NATO's agencies to the Danish context: The establishment of a National Long Lines Agency, the participation in exercises, the need for prioritising the use of communication networks in

[628] Note on the securing of telex traffic, May 9 1968 (including later handwritten notes). ITTS, NALLA Denmark, Journalsager, 18, 94. RA.
[629] Ibid.

wartime, the protection of communication nodes in potential target areas, and the problem of maintaining international telex networks. These initiatives were rarely articulated directly as requests from NATO, but 'channelled' through mediators such as the Defence Telegraph Administration, the Ministry of Foreign Affairs, and the government committee or the secretariat for civil emergency planning – after 1957 often with reference to agendas in the Civil Communications Planning Committee. However, as shown in this chapter, most of these problems related to wartime communications management were already discussed in the civil-military cooperation in Denmark. This mirrors a point brought forward in existing research on other areas of NATO cooperation, namely that demands and decisions made in NATO's committees were, in reality, a systematisation and an institutionalisation of already existing practices in the member states.[630]

Beginning in the 1960s, a gradual transfer of security responsibilities to the telecommunications sector is evident. This can be understood as a continuation of a phenomenon that I examined in chapter three, namely the political practice established through the 1950s, whether articulated or not, that the military needs for communications should primarily be met by establishing common facilities and, with the closure of the Defence Telegraph Administration, that the P&T was the best suited agency for managing many of the defence and security aspects of communications. This line was further pursued with the decision to transfer the responsibility of NALLA to the P&T, first, in 1962, as the peacetime host of the NALLA secretariat and from 1975 as the responsible authority, thereby establishing continuity between peacetime and wartime responsibilities. This transfer fitted with the sector responsibility principle defined in the 1959 law on civil emergency planning, and it appears from my examinations that the Secretariat for Civil Emergency Planning acted as an important motive force in this regard. The chapter thereby adds important knowledge to existing research on the Danish total defence, in which the practical implementation of the sector responsibility principle in different areas of the total defence still constitutes a lacuna. As my examinations reveal, the scope and content of this principle came into being in an interplay between the involved actors.

The development described above involved two aspects that need to be accentuated. One is the role on the technical expert, a role that has also been studied in previous historical research. In their examination of the technopolitics of the Cold War, Gabrielle Hecht and Paul Edwards note how the Cold War competition in scientific and technological areas helped to entrench and increase the participation of experts in governance.[631] This

[630] Schmidt and Miller, *PET's virkemidler*, p. 76.
[631] Hecht and Edwards, "The Technopolitics of the Cold War", p. 286.

phenomenon is mainly connected with the first decades of the Cold War, after which technological expertise began to spread more widely outside of the realm of the state. My examinations of security governance in the area of telecommunications in Denmark have shown that the technical expert gained importance through the Cold War period. A turning point in telecommunications governance was the automation, which was carried through in different stages in Denmark up to the 1970s. The automation, along with the immense extension of communications in the same period, meant that securing the communications facilities became an increasingly complex task. When perceived through the lens of technopolitics, this meant that the scope of possible action in terms of security was increasingly defined by technological possibilities more than political priorities.

The second and last aspect that I wish to highlight is the general broadening of the object of security governance. Research into the history of critical infrastructures has touched upon how the functioning of systems critical for society gained importance through the Cold War period and became increasingly 'detached' from defence and civil defence planning to become a security problem in its own right.[632] This is a topic that still requires further exploration. My examinations of the case of telecommunications in Denmark have revealed that while the initiatives launched in the 1950s and early 1960s focused on securing the communications facilities against the nuclear threat, communications vulnerabilities were approached much more broadly in the later Cold War years. This can be understood both as a response to the period of détente that emerged in the East-West relations in the 1960s and as a consequence of the transfer of security responsibilities to civilian actors and the increased focus on continuity between peacetime and wartime planning.

[632] Collier and Lakoff, "The Vulnerability of Vital Systems".

[6]

Public-private balances in communications security

> On 28 November 1974, the Danish Supreme Court delivered a judgment in a case between the telephone company KTAS and the Ministry of Public Works. The Supreme Court ruled invalid an order given by the ministry to KTAS in 1967 with reference to the 1959 law on civil emergency planning to establish so-called 'disposal circuits' on specified conditions – circuits that should be made available exclusively to military and civil emergency communications in times of crisis.[633]

In this chapter, I turn my attention towards a particular challenge embedded in the security governance of telecommunications in Denmark: the public-private division of responsibility in preparedness planning. As the 1974 Supreme Court ruling indicates, the obligations stemming from the 1959 law on civil emergency planning became a topic for discussion within the sector. The 1959 law gave – as described in chapter five – Danish ministries the authority to give orders to public institutions and private companies about taking measures to secure capital goods and establish a specified minimum of supplies and means of production. The question was, however, what 'securing capital goods' and 'minimum of supplies' meant in respect to telecommunications?

Given the particular hybrid structure with both public and private management in the Danish telephone sector, the 'private' telephone companies KTAS and JTAS – in which the state owned the majority of the shares – played a key role in telecommunications preparedness planning and the Danish total defence. In chapter three and five, I have mainly treated these two companies as part of the 'tele administrations' along with the P&T and the FkT, given the circumstance that in the relations with the military, these four administrations often formed a unified group. Now, however, I shall examine how the participation of these 'private' actors in the preparedness planning was perceived by the companies themselves and from a political point of view. The chapter shows how the involvement of the telephone companies in preparedness planning was not straightforward, since national security agendas did not necessarily align with business interests.

---

633 *Ugeskrift for Retsvæsen*, 1975 A, p. 63.

The chapter is structured around the circuits case leading to the 1974 Supreme Court ruling, in which the limits of the 1959 law on civil emergency planning were tested. By delving into this case, I examine what kind of manoeuvring room the Cold War preparedness agenda left behind for the 'private' actors in the telecommunications sector. The participation of different societal sectors in Cold War preparedness is generally an underexplored topic in historical research, not least when it comes to the role played by private businesses. An important exception in this regard is a study of a Swedish company producing rayon by the Swedish historian Magnus Linnarsson, demonstrating how the Swedish state kept the company 'alive' due to its wartime importance despite its poor economic performances.[634] Linnarson's work points towards the general tendency that when planning for a total defence during the Cold War, states had to rely on the capacity of private businesses in order to plan for the maintenance of all societal sectors in case of war. In continuation hereof, I suggest in this chapter that we understand the relationship between the state and private actors in Cold War preparedness planning as mutual. On the one hand, the state apparatus depended on the expertise of sector-specific businesses. On the other hand, these businesses were also interested in goodwill from the state and the public in general.

As an epilogue, I conclude the chapter by briefly looking into how the liberalisation of the Danish telecom sector initiated towards the end of the Cold War period challenged existing practices of preparedness planning in the area of telecommunications.

6.1 The 'circuit controversy'

The heart of the matter of the controversy around disposal circuits leading to the Supreme Court case was that the telephone companies had no interest in unused circuits reserved for emergency situations lessening the capacity in the network for paying customers. At the same time, however, as they relied on concession granted privileges, keeping good relations with the state and providing good service also in terms of security was vital for the telephone companies. In this section, I delve into the controversy on the disposal circuits with the aim of examining the dilemma that the telephone companies faced as they had to balance between their subscribers and the market, on the one hand, and the security of the state on the other. I do this by studying the course of events leading up to the 1974 Supreme Court case as follows: First, I examine the technopolitical backgrounds for the construction of this particular kind of circuits. Second, I examine the political negotiations on the issue and, third,

[634] Linnarsson, "Rayon för rikets försörjning". See also Lakomaa, "The history of business and war: Introduction".

the position taken by the telephone companies. Finally, as a fourth step, I follow up on the Supreme Court case and the aftermath.

Reserved versus disposal circuits

As described in chapter three, the new circuits needed for defence purposes in the 1950s were established as so-called 'reserved' circuits. This referred to a system where new special permanent lines – 'tails' – were established from the military enterprises to the nearest local telephone exchanges and paid for by the defence authorities. In between the exchanges (i.e. the 'interurban' connections), the already established circuits were used – circuits which under normal circumstances were used for regular phone traffic. In case they were needed, whether for an exercise or in the case of emergency, the reserved circuits could be taken manually out of the normal operation by the personnel operating the exchange central and connected to the 'tails'. In this way, a network was established – using parts of the common network – for military or emergency purposes only.[635]

This arrangement came about since the defence authorities wished to cover their communication needs in the cheapest possible way and since the increased military requests for facilities brought along with the NATO membership were difficult to meet for the Danish telecom sector. Accordingly – and in line with NATO standards – a large number of reserved circuits were established for the defence and the Civil Defence during the 1950s. However, within the telephone administrations, the system of reserved circuits began to be questioned: Besides causing a lot of extra work for the personnel at the telephone exchanges, the question was raised of what would actually happen to the normal telephone traffic if all the reserved circuits were coupled (i.e. connected) in a critical situation. At a meeting in the Coordination Committee in June 1954 where the matter was discussed, the director of JTAS, Paul Draminsky, predicted that if the telephone companies had to hand over fifty per cent of the circuits after the declaration of alert, as the aforementioned figure rule adopted in NATO prescribed, they would face a situation that they could not control.[636]

The plans for coupling in reserved circuits in wartime were also considered in NATO's communication agencies. Following the adoption of the nuclear strategy and the increased focus on the vulnerability of the existing communications systems, as analysed in chapter four, SHAPE recognised that is was necessary to "review our need for certain of our circuits and put them in

[635] Note on guidelines for reserved circuits, January 12 1953. TTS, Rådighedskredsløb. RA.
[636] Minutes of SU meeting, May 24 1954. TM, TTS, Bilag til samarbejdsudvalgets møder. RA.

a more realistic priority as far as the PTTs were concerned."[637] In May 1955, upon a request from SHAPE, ELLA presented a new set of categories according to which the circuits required for the Allied Command Europe could be organised. The categories consisted of circuits to be implemented in peacetime; circuits to be implemented automatically after the declaration of an alert; circuits to be implemented at the request of the command concerned after the declaration of alert; and circuits required for forces build up and system reinforcement, i.e. circuits primarily furnished for infrastructure planning and not related to operations in an early phase of a war.[638] In each category, the circuits were organised in a certain order of priority after which they would be put into operation when the circuits in the category were to be implemented. For instance, the circuits to be implemented automatically after the declaration of alert should either be provided immediately, or within the first 24, 48, 72, or 96 hours of the alert.[639] In this way, ELLA drew up a priority plan for all the PTT circuits which would somehow play a part in a future war.

In Denmark, the telecom sector began integrating these different categories into their work. The coupling in of the different reserved circuits in wartime was tested in the aforementioned signal exercises, of which the first was held in 1954. In the exercises, the tele administrations established the reserved circuits by the declaration of alert and reported to the defence authorities when the circuits were ready for use.[640] In connection with the exercises, however, the representatives from the telephone administrations began questioning the arrangement with the reserved circuits. Moreover, through the 1950s, a new challenge emerged as more and more telephone exchanges were automated. From a technical point of view, automation made it harder to carry through a gradual limitation of the traffic in critical situations and necessitated the shutting down of access for larger groups of subscribers.[641] Additionally, automation meant that fewer personnel would be available at the exchanges to monitor how the network would react in the event of an alert.[642]

---

[637] Briefing by General Garland, October 3 1956. Annex to C-R(56)53. NA.
[638] Note on priority system, May 25 1955. ELLA/Memo/6(Final), Annex B to AC/109-D/2. NA.
[639] Briefing by General Garland, October 3 1956. Annex to C-R(56)53. NA.
[640] Report on guidelines for cooperation between the tele administrations and NALLA, February 1959. TTS, Udvalget til Reorganisering af Forsvarets Telekommunikationstjeneste 1956-1961. RA. However, after SIGEX Three, a new practice emerged according to which the tele administrations on their own established the circuits and only reported to the defence authorities after four hours which circuits were not yet ready. See: Instructions on the communications network of the defence during increased alert, undated. Forsvarets Telenet, 3353 Telesidens historie. EA.
[641] Minutes of SU meeting, September 26 1957. TM, TTS, Bilag til samarbejdsudvalgets møder. RA.
[642] Report on guidelines for cooperation between the tele administrations and NALLA, February 1959. TTS, Udvalget til Reorganisering af Forsvarets Telekommunikationstjeneste 1956-1961. RA.

In order to deal with this, the Coordination Committee decided in April 1959 to set up a working party to examine which strain on the common network a coupling to the reserved circuits would cause.[643] The committee submitted a report in August 1960 with a very clear conclusion: Coupling of the reserved circuits would cause a traffic chaos and potential breakdown, not least on the automated exchange centrals. In order to prevent this, the report concluded, the majority of the reserved circuits had to be removed.[644] When the report was discussed in the Coordination Committee, liaison officer Jessen declared that the issue was a concern for the telephone administrations and not for the defence. From a military perspective the arrangement with the reserved circuits was exactly what was needed. Jessen added that they had to keep in mind that "Denmark had made a commitment to provide reserved circuits free of charge for NATO."[645] By contrast, the telephone companies were of the opinion that the national handling should not be adapted to the NATO procedures if it was unsuitable.[646] Instead, in October 1961, they proposed an alternative model with so-called 'disposal circuits' [rådighedskredsløb] where all of the circuits needed for military and civil defence and preparedness use were established permanently in peacetime – the 'tails' as well as the interurban connections. In that way, the security authorities had isolated networks reserved for them, and it would be certain that the capacity was enough to cover civil as well as military needs. A prioritisation of military versus civil traffic needs would then only be necessary in case of damages on the network.[647]

The telephone companies internally agreed to abolish the reserved circuits and replace them by disposal circuits, as the construction situation gradually enabled it. This meant that the users of the circuits – military authorities, civil emergency agencies etc. – now had to pay regular tariffs for the establishment and subscription of the circuits.[648] In this way, the telephone companies used the technical expertise that they possessed to pursue a specific technopolitical agenda. In the spring of 1962, the tele administrations began to refuse constructing these circuits and instead suggested them established as

---

643 Minutes of SU meetings, March 23 1959 and April 30 1959. TM, TTS, Bilag til samarbejdsudvalgets møder. RA; Kommissorium for udvalg til behandling af spørgsmål om forberedende kredsløb, May 20 1959. Telefontilsynet, Rådighedskredsløb. RA.
644 This course of events was later outlined in: Background note by SO on reserved circuits, August 24 1962. TTS, Rådighedskredsløb. RA.
645 Minutes of SU meeting, September 29 1960. TM, TTS, Bilag til samarbejdsudvalgets møder. RA.
646 Minutes of SU meeting, October 27 1960. TM, TTS, Bilag til samarbejdsudvalgets møder. RA.
647 Minutes of SU meeting, October 26 1961. TM, TTS, Bilag til samarbejdsudvalgets møder. RA.
648 Background note by SO on reserved circuits, August 24 1962. TTS, Rådighedskredsløb. RA.

disposal circuits.[649] As this led to criticism from defence and civil defence authorities, the Coordination Committee asked its subcommittee dealing with tariff questions to examine the matter. The tariff committee compared the costs of the proposed disposal circuits with other rented circuits and concluded that using the same calculations would cause a dramatic increase of the defence expenses: 2.2 million kroner yearly in addition to the 4.3 million that defence authorities already spent on permanent and reserved circuits. The committee also noted that since the wish for making the reserved circuits permanent had come from the telephone administrations themselves, it would probably be necessary to give the defence authorities a discount on the disposal circuits.[650]

In response to the report from the Committee on Tariffs, which was finished in August 1962, the Coordination Committee noted that the question would have to be taken up with the Minister of Public Works.[651] In this regard, the telephone company FkT stressed that when the findings were to be presented to the Minister of Public Works, one should add that "it would be found unfair if such a large discount was given [...] that the telephone administrations did not have all their expenses covered whereby the subscribers would come to pay donations to emergency measures." The P&T was of another opinion and replied that profit on telephone circuits should be made on income from telephone conversations, not on arrangements like disposal circuits that did not carry telephone traffic under normal circumstances. The telephone companies and the P&T however reached the agreement that for circuits and establishments that did not run traffic, the telephone administrations should at least have their expenses covered – for which reason the tariff for disposal circuits should be based on the normal tariffs with a discount of no more than twenty per cent.[652]

The governmental perspective

After 1962, the Danish government became involved in the controversy on preparedness circuits. The suggested arrangement of disposal circuits involved a number of divisive issues to be settled, issues that split the telephone administrations internally and caused disagreement within the government. I shall now examine the two central aspects of the dispute, namely the financing of the disposal circuits and the legal basis for ordering the telephone companies to establish the circuits on specified terms. Hereby, it is possible to gain insight into how the government and its administration (i.e., in this case, the ministries

[649] Minutes of TTS meeting, April 5 1962. TM, TTS, Tilsynets Mødereferater. RA.
[650] Note by the tariff committee, August 24 1962. TTS, Rådighedskredsløb. RA.
[651] Background note by SO on reserved circuits, August 24 1962. TTS, Rådighedskredsløb. RA.
[652] Minutes of SU meeting, September 4 1962. TM, TTS, Bilag til samarbejdsudvalgets møder. RA.

of defence, interior and public works) positioned themselves in the discussion about national security and business interests in relation to preparedness planning.

Preparedness circuits: The financial perspective

The proposal from the Committee on Tariffs triggered a long-term correspondence between the Ministry of Defence and the Ministry of Public Works. Referring to the fact that the Ministry of Interior, including the Civil Defence and the Secretariat for Civil Emergency Planning agreed with them, the Ministry of Defence rejected the proposed tariffs as being way too high in proportion to the actual expenses. The telephone administrations later suggested a discount of fifty per cent, but the Ministry of Defence referred to the fact that NATO rented international circuits at a fixed payment of no more than five per cent of the normal tariffs. Accordingly, the Ministry of Defence and its allies expressed their willingness to pay five per cent of the normal rates as a kind of administrative charge.[653]

In September 1965, the issue was taken up at a meeting held in the Ministry of Public Works. At this point, the ministry had since 1955 been served by the social democrat minister Kai Lindberg. At the meeting, the ministry's permanent secretary, Palle Christensen, declared that the ministry supported the tariff proposal made by the telephone companies.[654] However, representatives from the other ministries disagreed, and no settlement was reached. The issue was later considered in the government's finance committee, where Kai Lindberg as Minister of Public Works was bound to accept the five per cent tariff.[655] At the same time, however, the Minister of Interior, social democrat Hans Hækkerup, accepted as a general principle that the companies should have their expenses for the circuits covered. The Ministry of Public Works was therefore asked to request a financial account from the telephone companies documenting their actual expenses for establishing the disposal circuits.[656]

Following a long correspondence between the ministries about how to add up the expenses, a settlement was still not reached by the fall of 1966, when Prime Minister Jens Otto Krag reshuffled his social democratic government.[657]

---

[653] Letter from FM to MOA, September 7 1963; Letter from FM to MOA, February 10 1965; Note by SCB on the allocation of costs, September 16 1965. TTS, Rådighedskredsløb. RA.

[654] Note from meeting in MOA, September 14 1965. IM, SCB: Sager vedrørende det civile beredskab 1950-2005, 7. RA.

[655] Extract from minutes of meeting, December 2 1965; Continuation of September 16 1965 note, September 2 1966. TTS, Rådighedskredsløb. RA.

[656] Note from meeting in MOA, December 14 1965. TTS, Rådighedskredsløb. RA.

[657] Jens Otto Krag served as Danish Prime Minister from 1962 to 1968 and again 1971-1972. In the first two years, his government included the social liberal party. See: Statsministeriet, "Regeringer siden 1848"

Svend Horn was appointed new Minister of Public Works and shortly after received a letter from Hans Hækkerup, who had continued as Minister of Interior. Hækkerup wanted the two ministries to come to a settlement in the tariff question, emphasizing the fact that the issue had been raised only because of the automation of the telecommunications technology and not due to wishes from military and emergency authorities. Hækkerup outlined how these authorities had nevertheless acknowledged that the arrangement with disposal circuits would have certain advantages from a security point of view, for which reason they had offered to pay five per cent of the normal tariffs for the circuits. Hækkerup emphasised how he found this to be an appropriate solution.[658] Despite opposition within the Ministry of Public Works and a persistent effort from the telephone companies to document that the five per cent tariff would not cover their expenses, the Ministry of Interior stood firm on the five per cent tariff and succeeded in convincing the Ministry of Public Works to force this tariff through.[659] As a result, the Ministry of Public Works informed the telephone companies in June 1967 that they were obliged to establish the circuits in question at the five per cent tariff.[660]

Since the two parts – the telephone companies represented by the Ministry of Public Works and the preparedness authorities represented by the Ministry of Interior – were not able to reach a settlement on how to assess the actual expenses related to preparedness circuits, the issue of the tariffs was ultimately a balancing between two different stands: One criticizing the fact that preparedness planning would eventually happen at the telephone subscribers' expense, and another arguing that this was not an area in which the telephone companies should be able to make profit. Both stands shared the argument that preparedness planning was a common concern for the whole society. In the end, the Ministry of Public Works was overruled by the Ministry of Interior. In order to understand how this happened and on which basis the five per cent principle was forced through, it is necessary to have a closer look at the legal framework in the area of preparedness.

Preparedness circuits: The legal perspective

When the secretariat of the Coordination Committee sent the report on tariffs to the telephone administrations in August 1962, they attached a note pointing out that the telephone administrations were "required to contribute to covering the national preparedness agencies' need of telecom circuits".[661] The obligation

---

658 Letter from IM to MOA, December 10 1966, TTS, Rådighedskredsløb. RA.
659 See for instance: Letter from MOA to IM, January 4 1967, TTS, Rådighedskredsløb. RA.
660 Letter from MOA to FkT, JTAS, and KTAS, June 19 1967. TTS, Rådighedskredsløb. RA.
661 Background note by SO on reserved circuits, August 24 1962. TTS, Rådighedskredsløb. RA.

was highlighted with a reference to the concessions assigned to the telephone companies. The concession given in 1948 stated that the telephone companies were obliged to "contribute to the state's telecommunication services of every kind and provide the, for that purpose, necessary facilities" on "conditions specified by the minister".[662] This was stated again in the concessions given in 1961 along with the addition that the Minister of Public Works

> "with a view to extraordinary conditions [can] give the concessionary orders on securing and maintaining the essential telecommunications traffic, if necessary by limiting the common public access to conversations through the network."[663]

Along with the concessions, the aforementioned law on civil emergency planning passed in December 1959 gave the different ministries the authority to take the necessary measures concerning civil emergency planning within their area of responsibility. At a meeting held in the Ministry of Public Works in September 1965, Toft-Nielsen from the Secretariat for Civil Emergency Planning participated. According to Toft-Nielsen, a paragraph in the law on civil emergency planning could be taken in use to solve the issue.[664] It appears from a later correspondence between the stakeholders that the preparedness authorities were of the opinion that the situation with the preparedness circuits was equal to the scenario described in paragraph five of the law on civil emergency planning. This paragraph stated that a minister could order public and private institutions and companies to take necessary measures in order to secure capital goods and stocks and establish a specified minimum of supplies and means of production. The paragraph also stated that if the companies in question could include the expenses of these measures in their commodity prices, they could not get compensation from the state, as they were not placed at a disadvantage from a competitive standpoint.[665]

Initially, the Ministry of Public Works did not approve of making use of the law.[666] A few years before, in 1962, the secretariat of the Coordination Committee of the Telephone Control Board under the Ministry of Public

---

[662] Notification from MOA about §7 of KTAS June 30 1919 concession, August 31 1948. TTS, Diverse. RA.
[663] Notification from MOA about §3 of JTAS concession, June 28 1961. TTS, Diverse. RA.
[664] Note from meeting in MOA, September 14 1965. IM, SCB, Sager vedrørende det civile beredskab 1950-2005, 7; Note by SCB on the allocation of costs, September 16 1965. TTS, Rådighedskredsløb. RA.
[665] Note by SCB on the allocation of costs, September 16 1965. TTS, Rådighedskredsløb. RA.
[666] Note from meeting in MOA, September 14 1965. IM, SCB, Sager vedrørende det civile beredskab 1950-2005, 7; Note by SCB on the allocation of costs, September 16 1965. TTS, Rådighedskredsløb. RA.

Works had found that the 1959 law did not give the state authority to stipulate particular price terms when ordering preparedness measurements to be taken.[667] The telephone companies maintained that it was doubtful that the paragraph could be used in their case, referring to the fact that they were concessionary companies. They argued that their concessions contained an exhaustive specification of all the rules they were subject to. As mentioned in chapter three, the concessions had been renewed in 1961. At this point, the law on civil emergency was already passed, and the only addition regarding preparedness in the new concessions stated that the companies were obliged to maintain essential traffic in exceptional circumstances, if necessary by limiting the common public access. Consequently, the companies did not find that the concessions entitled the state to regulate the prices for the services provided by the telephone companies, even in the case of emergency situations.[668]

Nonetheless, the Ministry of Interior remained firm on the idea of using the law. In a letter written in December 1966, the Minister of Interior, Hans Hækkerup, informed the new Minister of Public Works, Svend Horn, that there was now "in principle" agreement on paragraph five of the law being applicable to the circuit issue, since the disposal circuits were to be understood as a "capacity expansion."[669] In January 1967, Horn replied that his ministry accepted that the paragraph was usable, but only in the sense of ordering the companies to provide an overcapacity in their networks – not in the sense of ordering circuits for preparedness purposes only. This was not to be understood as a capacity expansion, but instead as confiscation, Horn argued.[670]

The issue was then discussed in the Government Committee on Civil Emergency Planning, in which it was decided to present the case to the Legal Advisor to the Danish Government. The Legal Advisor supported the view of the Government Committee on Civil Emergency Planning underlining the fact that even though the formulation of paragraph five did not include telecommunication facilities, the task of securing the communications apparatus was explicitly mentioned in the objects clause of the law.[671] On this basis, the government went through with the order, which was – as mentioned above - announced to the telephone administrations in a memorandum from the Ministry of Public Works dated June 19 1967.[672] Clearly, the position of the Ministry of Public Works was overruled by the Ministry of Interior and the

---

667 Background note by SO on reserved circuits, August 24 1962. TTS, Rådighedskredsløb. RA.
668 Note on the cover of the tele administrations' expenses, October 22 1965; Letter to MOA from Pedersen, March 10 1966. TTS, Rådighedskredsløb. RA.
669 Letter from IM to MOA, December 10 1966. TTS, Rådighedskredsløb. RA.
670 Letter from MOA to IM, January 4 1967. TTS, Rådighedskredsløb. RA.
671 Letter to SO from MOA, March 6 1967. TTS, Rådighedskredsløb. RA.
672 Letter from MOA to FkT, JTAS, and KTAS, June 19 1967. TTS, Rådighedskredsløb. RA.

Government Committee on Civil Emergency Planning. This was later commemorated in a note by the Ministry of Public Works outlining how the government committee had "ordered" the minister to draw up the order to the telephone companies – despite the fact that the minister had "maintained that such an order would be illegal".[673] This is supported by later descriptions in Danish newspapers of a "reluctant" minister.[674]

It remains unclear which strategic considerations took place within the Government Committee on Civil Emergency Planning, but the fact that the government committee entered the stage, side-lining the Ministry of Public Works, indicates that the circuits were perceived as an important security matter. As my examinations in chapter five of the transfer of the responsibility of NALLA to the P&T revealed, it appears to have been a strategy for the government committee and secretariat responsible for civil emergency planning to ensure that the aim of the 1959 law was realised to the greatest possible extent. However, since the telecommunications sector was within the responsibility area of the Ministry of Public Works, the order had to be issued by this ministry. Whereas the Ministry of Public Works had previously formed a united front against the defence authorities along with the telephone companies and acted on behalf of them in political negotiations, the ministry was now forced to reverse its stance towards the telephone companies. However, the formulation of the order appears a bit premature – at least, in a legal sense, the order was not very clearly formulated and, as it turned out, did not stand up in court. One can speculate whether this – to a certain extent at least – was deliberate, since the department of the ministry did not support the reason for the order.

Interestingly, the question of uniting or nationalising the telephone sector never came up in the discussions about the preparedness circuits, although the shifting social democratic governments through to 1968 supported uniting the private telephone companies and P&T's telephone services in one company owned by the state.[675] Given the picture painted in previous research that Western governments, due to security agendas, in general tightened their control over the communications sectors in these years, one would assume that the task of preparedness could have been used as an argument in favour of a nationalised, unified telephone sector.[676] By all accounts, the legal and financial aspects of preparedness planning would be more straightforward with a public corporation in charge of all national telecommunications. However, the pattern

---

673 Note by MOA on the occasion of a letter from IM, July 4 1977. TTS, Rådighedskredsløb. RA.
674 See for instance *Weekendavisen,* December 6 1974, p. 4.
675 Johansen, *Fra monopol til konkurrence*, p. 81.
676 See: Millward, "Business and the State", p. 546; Reynolds, "Science, technology, and the Cold War", p. 390.

seems to be that the discussion about the layout of the telephone sector and the discussions about preparedness took place in very different spheres, the latter in well-informed circles and behind closed doors.

Summing up, the disposal circuits were a divisive issue within the Danish governments in office through the 1960s. It appears clear that the Government Committee on Civil Emergency Planning and its head of secretariat Toft-Nielsen were in a strong position when it came to preparedness policy and exercise hereof and played a key role in both the disposal issue and the reorganisation of NALLA that went on in the same period. Accordingly, allowing for commercial interests of private businesses like the telephone companies – even though the state owned a majority of the companies' shares – was not an option. Toft-Nielsen's standpoint on the importance of civil emergency planning is evident from a seventeen page long memorandum that he sent to the department of the Ministry of Interior in October 1967:

> "It is not only a question of facing the consequences of the fact that the civilian population to a much greater extent than previously can be exposed to the consequences of the war through reduced possibilities of supplies, transport etc. and that the population can be directly exposed to war incidents. We are dealing with the necessity of the civilian society to a much larger extent to be prepared to provide support to the military defence. In the smaller countries in particular, the defence can no longer be self-sufficient to the same extent as previously. The defence must base its planning on extensive help from the civil society."[677]

Although the Danish preparedness policies towards the private sector is rather unexplored, there is no indication that any other area turned out to be so difficult to manage as the area of telecommunications.[678] This raises the question of whether it was the vital and complex nature of the telecommunications infrastructure or the hybrid structure of the sector between public monopoly and private service that complicated the cooperation on preparedness planning. In order to examine this, I shall now change the perspective to that of the telephone companies.

---

[677] The October 1967 memorandum written by Toft-Nielsen is quoted in: "Det danske totalforsvars historie", p. 6. IM, SCB, Sekretariat for Civilt Beredskab, 1. RA.

[678] See for instance Bergsøe, "Hvis krigen kommer - til Vejle", in which the participation of local authorities or businesses (for instance suppliers of water, gas and electricity) in preparedness measures is not referred to as troublesome.

The position of the telephone companies

What remains to be clarified is how the telephone companies situated themselves in the discussion between state security and business interests. An insight into this can be gained through an examination of the response of the telephone companies after receiving the 1967 ministerial order focusing on the considerations and actions leading to the point where KTAS took legal actions against the Ministry of Public Works. As evident from above, the government did not bring the issue of the concessions and the plans for uniting the telephone sector into the discussions on preparedness circuits. However, the fact that the telephone companies relied on concession granted privileges raises the question of whether they were concerned about keeping good relations with the state.

When the telephone companies were handed over the order in the summer of 1967, it was received with reservations. The first step of the companies was to ask a legal expert, Professor and Doctor of Law Poul Andersen, to examine the case, in particular the question of whether the law on civil emergency planning actually gave the ministry the authority to make such an order.[679] Without reservations, Professor Andersen concluded that the law did not give authority to lay down a specified payment for the use of the companies' circuits.[680] In response to Professor Andersen's statement, KTAS requested to the Ministry of Public Works that the matter should be brought up for discussion once again. The smaller company FkT agreed to the position taken by KTAS, whereas JTAS, by contrast, decided to follow the order given by the ministry and began managing the circuits as prescribed.[681]

However, resuming talks with the ministry was a tricky task. The ministry did not respond to the request from KTAS before January 1971. In the meantime, KTAS's Director Rosbæk informed his fellow colleagues in the other companies that the matter had been discussed in KTAS' board, which had shown a willingness to carry on with the case.[682] KTAS therefore initiated a public campaign. For instance, in the television news in the beginning of January 1971, KTAS director Rosbæk gave the government an ultimatum by demanding that the state before the next Tuesday agreed to pay for the disposal circuits. If not, the company would take legal action against the ministry.[683] When the ministry responded that it stood firm on its former decision, director

---

679 Minutes of SO meetings, October 19 1967 and November 16 1967. TM, TTS, Mødereferater. RA.

680 Statement from Prof. Poul Andersen, October 20 1967. JTAS, Journalsager 1896-1988, 211, A3a. RA.

681 Letter from MOA to IM, January 21 1969. TTS, Rådighedskredsløb. RA; *Weekendavisen*, December 6 1974, p. 4.

682 Minutes of SO meeting, March 20 1970. TM, TTS, Mødereferater. RA.

683 *Berlingske Tidende*, January 9 1971, p. 2. In the article, Johannes Rosbæk, the KTAS director, is misspelled as Johs. Rosted.

Rosbæk consequently announced to the Coordination Committee that his company wanted to bring the matter before the court of law.[684]

Clearly, the relations between the stakeholders were tense at this point. On the face of it, it appears to be a huge gamble to take legal actions against the ministry in charge of your means of existence as a company. A lawsuit was a dramatic step to take, given the fact that the telephone companies had hitherto been able to avoid a state take-over by largely meeting the expectations from the state.[685] However, as described in chapter three, despite intentions, shifting Danish governments had not taken steps towards a stake take-over of the companies. By contrast, the course of events in the telephone commission of the 1960s had put the matter on hold for a while, and this was probably further enhanced by the many replacements in the ministerial office of the Ministry of Public Works following the long period from 1955 to 1966, where Kai Lindberg had served as minister.[686]

Furthermore, there are indications that KTAS was well-informed about the lack of support for the order within the Ministry of Public Works. Already in the spring of 1967, before the order was formulated, the ministry's department addressed the Legal Advisor to the Danish Government explaining that is was possible that legal actions could be taken against the state contesting the validity of an order to establish the concerned disposal circuits without getting full compensation for the expenses.[687] Moreover, the fact that it took the ministry three years to answer KTAS on whether it stood firm on the order or not, indicates that doubt or disagreement existed within the ministry – a circumstance that KTAS was most likely well aware of. It is also important to note that the chairman of KTAS' board was the social democrat politician Kaj Bundvad, who had been Minister for Social Affairs until 1968 – that is, he had

---

[684] Minutes of SO meetings, January 21 1971 and August 25 1971. TM, TTS, Mødereferater; Letter from MOA to KTAS and FkT, January 8 1971. TTS, Rådighedskredsløb. RA.

[685] As outlined by Blüdnikow, the four tele administrations had managed to establish "an impressively well-run" telephone network since the 1950s. Blüdnikow, *Enhedsvæsenet*, p. 113.

[686] Ibid., p. 114. The social democrat Svend Horn served as minister 1966-1968, whereupon a period with shifting liberal (Ove Guldberg 1968-71, Kresten Damsgaard 1973-75, Ivar Hansen 1978-79) and social democratic (Jens Kampmann 1971-73, Niels Matthiasen 1975-1977, Kjeld Olesen 1977-78, Jens Risgaard Knudsen 1979-81) ministers followed.

[687] Letter to SO from MOA, March 6 1967. TTS, Rådighedskredsløb. RA. Moreover, in his short overview of this case, Per Heikel Vinther speculates whether the permanent secretary of the Ministry of Public Works, Palle Christensen, purposely tried to obstruct the agenda of the other ministries. However, it must be taken into consideration that it also appears from Vinther's memoirs that he himself was closely involved in the matter: "Teleberedskabet og Databeredskabet", p. 6. IM, SCB, Sager vedr. det civile beredskab, 7. RA.

been part of the government, who had decided to issue the order to the telephone companies.[688]

The Supreme Court ruling and the aftermath

The case was tested in the High Court of Eastern Denmark in December 1973 where KTAS did not have its claim against the Ministry of Public Works sustained. The ruling was appealed by KTAS and considered in the Supreme Court in November 1974. The three Supreme Court judges supporting the ministry emphasized that the disposal circuits were to be understood as a "preparedness-related reserve" and that the decision to change from prepared to disposal circuits had been made on a technical basis with regard to the risk of a breakdown of the civilian telephone traffic. Such circuits, the three judges argued, were to be understood as part of KTAS's "ordinary business activities." On the other hand, the four Supreme Court judges supporting KTAS did not find that the principle of a "minimum of supplies" in the law on civil emergency planning gave the ministry the warrant to order KTAS to make certain circuits available exclusively for emergency purposes.[689]

In the wake of the Supreme Court case, the involved parties to a large extent held on to their initial positions. The discussion on how to solve the issue of the preparedness circuits continued – with the use of the same arguments – until 1977, when an agreement was finally made. At first, the Ministry of Interior and the Ministry of Defense asked the Ministry of Public Works to issue an order to the telephone companies – this time with a formulation that was within the framework of the law on civil emergency planning.[690] As this did not happen, the Ministry of Interior made a new suggestion for an order.[691] In reply, the Minister of Public Works, Niels Matthiasen, stressed that the "Supreme Court has determined that the [defence and civil defence] needs to be covered should not be paid by the telephone subscribers, and it is my view that one should come to terms with this".[692] Moreover, his successor from February 1977 Kjeld Olesen, also a social democrat, noted in July 1977 that he "did not see a reasonable reason for or possibility of working out a new order to the telephone companies".[693] However Olesen also accentuated that if an order was to be issued, it should be issued

---

[688] *Berlingske Tidende*, January 9 1971, p. 2.
[689] Transcript of the records of the Supreme Court, case no. II 7/1974. Telefontilynet, Rådighedskredsløb. RA.
[690] Note on the possibility of a revision on the disposal circuit order, February 24 1976. IM, SCB, Sager vedr. det civile beredskab, 7, Dokumentation. RA.
[691] Remarks on the draft for a new order to the tele administrations, December 8 1976. IM, SCB, Sager vedr. det civile beredskab, 7, Dokumentation. RA.
[692] Letter from MOA to IM, January 14 1977. IM, SCB, Sager vedr. det civile beredskab, 7, Dokumentation. RA.
[693] Letter from MOA to IM, July 4 1977. TTS, Rådighedskredsløb. RA.

by him.[694] In October 1977, Olesen invited the other involved ministers to a meeting with the purpose of settling the case once and for all. At this meeting, the three ministries managed to come to an agreement about how to lay down the tariffs for the disposal circuits. The ministers agreed that instead of managing permanent long-distance circuits and the disposal 'tails' separately, a unitary tariff should be charged for all circuits ordered by defence and civil defence authorities. This tariff was first set to 50 per cent of the regular circuit tariff, rising to 60 per cent by the spring of 1978.[695] With this agreement, an arrangement had fallen into place as for how to deal with all kinds of circuits needed for defence and civil defence purposes for the rest of the Cold War period.

To sum up, the circuit controversy serves as a case in point of how civil emergency planning in the area of communications became a site of struggle. Despite the fact that the dispute perhaps mainly appears to be a consequence of poor cooperative relations – and probably even a power struggle – between the involved ministries, including the Secretariat of Civil Emergency Planning, the case does shed light on an aspect of security governance which is of wider importance. This regards the issue of the participation of private or semi-private actors in preparedness tasks. The 'total defence' of the Cold War was an enterprise involving all parts of the society, including the private sector. Within the area of telecommunications, the state as well as the telephone companies agreed on the importance of making preparations so that the communication facilities would also be functional in case of crisis, not least for the most vital and critical functions of the society such as the military, the Civil Defence, the police, and other public authorities. The previous chapters of this dissertation have shown how the companies participated in many different aspects hereof and how many of the potential security problems were identified by the sector itself. Thus, the general impression is that the companies were an active and at times even agenda-setting partner in preparedness planning activities.

In this way, my examinations reveal how the governance of preparedness matters in the area of telecommunications took place in a mutual relationship between the state and the sector and rested on two pillars. On the one hand, the state had legal instruments with which it could instruct the telephone companies to take part in the activities: The concessions under which the companies operated and the 1959 law on civil emergency planning. However, as demonstrated in this chapter, both means left behind room for interpretation. On the other hand, the cooperation on communications

---

[694] Note by MOA on the occasion of a letter from IM, July 4 1977. TTS, Rådighedskredsløb. RA.
[695] Minutes by IM of meeting in MOA October 18 1977, October 26 1977; Note by MOA on meeting in MOA, October 18 1977. TTS, Rådighedskredsløb. RA.

preparedness also rested on a mutual 'goodwill' or, put differently, a community of interests that both the state and the companies could apply and make use of. The telephone companies were interested in participating in the preparedness activities for more reasons: First, their status as regional monopolies relied on privileges granted by the state. Second, many of the measures to be taken – including the disposal circuits – also rated as improvements of the communications infrastructure in general. Third, the state-owned shares and the close links that the companies had with local societies also appear to have generated a general societal concern. However, the question of what was of the greatest benefit to the society was open for interpretation and put to the test in the case of the circuit controversy. From this perspective, the legal proceedings taken by KTAS against the Ministry of Public Works can be understood as a litmus test for the reach of the sector responsibility principle in preparedness planning.

6.2 Epilogue: Liberalisation and security governance of communications

In the late 1970s, the dispute around the preparedness circuits had finally been settled. A few years hereafter, the area of telecommunications began to see changes, both at home and abroad. In Denmark – as part of a broader, international tendency – a number of steps were taken in the 1980s in order to reorganise the telecom sector. This was part of a broader, international tendency. In the years that followed, the area of telecommunications was met with new international and national agendas of privatisation and liberalisation, leading to major organisational changes in most Western European telecom sectors. In this section, I briefly discuss how these changes in the late Cold War years challenged existing practices of security governance of telecommunications.

Despite political ambitions to restructure the organisation of the Danish telephone sector, no changes had occurred through the 1970s. Instead, upon the 1971 dissolution of the telephone commission that had worked through the 1960s, as outlined in chapter three, the concessions granted to the telephone companies were extended for another five-year period four times from 1971 onwards. No major changes were made until the mid-1980s – with the exception of the 1982 reorganisation of the Telephone Control Board into the National Board on Telecommunications [Statens Teleråd], which however failed to gain an important role in unifying the sector.[696] In September 1982, the social democratic government stepped back and was replaced by a

[696] Johansen, *Fra monopol til konkurrence*, pp. 111ff., 137, 194ff.; Blüdnikow, *Enhedsvæsenet*, p. 120ff., 132.

conservative-liberal government led by Poul Schlüter, who was in power until 1993.[697] In line with new political agendas abroad, Schlüter's government called for a larger exercise of 'modernisation and debureaucratisation' of the public sector in Denmark and spoke heavily in favour of privatising parts of the public sector.[698]

In the mid-1980s, two major changes of the Danish telecommunications sector were carried through. On the one hand, all telecommunications services were transferred to the companies, except for the international services and a few nationwide tasks, which were placed in new a state-owned company, the National Telecom Service [Statens Teletjeneste]. On the other hand, all regulatory tasks were moved from the national board and the ministry and placed in an agency within the P&T.[699] This arrangement was however short-lived, since international trends of liberalisation – and more specifically developments within the European Economic Community (EEC) – also set in motion further developments in Denmark. In 1990, the Parliament decided to gather all the regional companies in one large holding company, Tele Danmark A/S, and in the following years, the Danish state sold its shares in the company.[700]

It lies beyond the scope of this dissertation to examine the processes of liberalisation and privatisation that swept over telecommunications markets both inside and outside Western Europe during the 1980s.[701] However, it is necessary to mention an important landmark in this process within the EEC, namely the green paper on European telecom sectors presented by the European Commission in 1987, which called for the liberalisation of telecommunications terminals and a number of services.[702] This process

---

[697] Schlüter's conservative party formed government with the liberal party and two smaller parties from 1982 to 1988, with the liberal and social-liberal parties to 1990, and with the liberal party to 1993. Statsministeriet, "Regeringer siden 1848".

[698] However, as demonstrated in a recent book on the Schlüter governments, the strong rhetorical stand on privatisation did not materialise in major concrete political changes. See Olesen, *De Danske Ministerier 1972-1993, Del 2*, p. 438f.

[699] Blüdnikow, *Enhedsvæsenet*, p. 135; Johansen, *Fra monopol til konkurrence*, p. 277. This reorganisation came into being after a proposal from a committee established in 1984, referred to as the Bernstein committee, named after its chairman, Nils Bernstein, the head of the administration department in the Ministry of Finance.

[700] Henten, "Dansk telefonhistorie", p. 17, 23f.; Blüdnikow, *Enhedsvæsenet*, p. 163f.

[701] In the United States, where communications were already in private hands, a deregulation period began from 1974 onwards, leading to the 1984 break-up of AT&T. In Europe, Britain was one of the earliest countries to undertake privatisation, leading to the 1984 final privatisation of British Telecommunications (BT). For more, see Eliassen and Sjøvaag eds., *European Telecommunications Liberalisation*; Lewis, "Telecommunication: Critical Infrastructure Protection".

[702] Thue, *Nye forbindelser*, p. 93. The "Green Paper on the Development of the Common Market for Telecom Equipment and Services" was occasioned by the 1986 adoption of the Single European Act leading to the establishment of a single market within the European Community by 1993.

eventually led to a system in which the European Commission played a central role in the regulation tasks related to telecommunications that had previously been carried out by national instances.[703] Previous research has outlined how the process of liberalisation of European telecom markets was driven by neoliberal economic agendas, by the promotion of the single market project, and by the technological developments towards digitalisation, which had introduced new players into the telecom markets.[704] By contrast, security and preparedness do not appear to have received much attention in this transition process, neither in the Danish nor European case. A noteworthy result hereof appears to be that the governance of telecommunications moved further away from the sphere of national security governance. This process is however still unexplored in research and calls for further examination in the future.

Clearly, this development fundamentally changed the conditions for the security governance of the area of telecommunications that had been established through the Cold War period. In the Danish case, the development towards privatisation affected both of the pillars described above, the legal framework as well as the community of interests. In 1988, at the suggestion of KTAS, the authorities involved in preparedness planning in the area of communications established an ad hoc working group in order to review how the organisational changes influenced the existing framework, including the future expectations to the security services provided by the telephone companies. The working group provided a number of recommendations to the preparedness authorities regarding renegotiations of the existing regulations and agreements between the state and the communications sector. Moreover, it pointed towards a number of disadvantages of the development towards privatisation in terms of preparedness planning, mainly that the communications services requested by preparedness authorities were expected to rise in price and that the spread of the delivering services on more hands was undesirable in terms of security.[705] By requests of i.a. the Civil Defence Board, the law on civil emergency planning was renegotiated and a new law with a broadened reach in terms of private businesses became effective as of 1993.[706] By this time, however, the post-Cold War era had begun.

Since the 1990s, more private and multinational corporations have entered into the scene, in Danish communications as well as elsewhere.[707]

---

[703] Eliassen et al., "European telecommunications policies", p. 17.
[704] Ibid., p. 17. Millward, *Private and public enterprise in Europe*, p. 244ff.; Michalis, *Governing European Communications*, p. 139f.
[705] Report by the ad hoc working group on liberalisation of the tele sector, October 4 1989. 974A-1-2. EA.
[706] For the need for change the existing law, see for instance: Letter from CFS to IM, October 8 1990. TTS, Rådighedskredsløb. RA. For the new law, see Beredskabsstyrelsen, "Beredskabsloven – med ændringer og forarbejder".
[707] See for instance Thue, *Nye forbindelser*.

Today, as a result, the involvement of private actors in 'public-private partnerships' is a cornerstone in national and international security governance of the information and communications technology (ICT) sector – and one that from time to time causes fundamental cleavages between different interests.[708]

When perceived through the lens of security, the developments towards privatisation and liberalisation that took place within the telecom sectors in most Western European countries in the late Cold War years may appear as a paradox. As I have shown in this dissertation, the preceding four decades had seen the devoting of many efforts into securing the telecommunications infrastructures, as these were perceived as vital for state security. Research into telecommunications history has stressed how the traditional strong state control of telecom sectors has been motivated by the character of telecommunications as an infrastructure critical for the society.[709] One can ask, then, if this was no longer the case in the 1980s. The economic historian Robert Millward has suggested that telecommunications were no longer regarded as key sources of security concern at this point, in the late Cold War period.[710] However, my findings in this dissertation suggest that this is a claim that requires further exploration. What had changed by the end of the Cold War period was perhaps not so much the perception of telecommunications as a security concern as the overall framework for security governance of the telecom sectors.

[708] Christensen and Petersen, "Public–private partnerships on cyber security", p. 1436. See also Carr, "Public-private partnerships in national cyber-security strategies"; Cavelty and Suter, "Public-private partnerships are no silver bullet".
[709] Thue, *Nye forbindelser*, p. 10.
[710] Millward, "Business and the State", p. 547.

[7]

Conclusion

The aim of this dissertation has been to investigate how the Cold War brought about a new security framework in the area of telecommunications. I have done this by focusing on different efforts to provide secure telecommunications in two, interconnected contexts, NATO and Denmark.

Historically, the governance of telecommunications security prior to the Cold War has mainly revolved around physical protection of the facilities or control of information flows and been targeted against enemy interception, sabotage, or propaganda. In this dissertation, I show how both political and technological developments in the Cold War period necessitated a new kind of security governance of the area of telecommunications. My findings can be summarized in two main arguments, which I shall enlarge on and discuss in this final chapter. The first is that the process of 'networking' NATO beginning in the early Cold War years was the result of new demands for communications stemming from the international, collective defence cooperation among the allies. Consequently, national tele administrations were drawn into a transnational system-building aiming to develop communications infrastructures that supported the objectives of the alliance, but also served other technopolitical purposes and came to affect developments in civilian communications in the member states too. The second argument is that the prospect of a total, nuclear war brought along new perceptions of vulnerability into telecommunications system-building and engaged a wide range of actors in telecommunications security governance – a governance process that extended beyond security challenges directly related to the Cold War.

I. Networking NATO – a technopolitical perspective

Through the Cold War period, telecommunications appeared on the central agenda in NATO at different occasions. One of the analytical perspectives that drove my examinations was that of technopolitics, as I set out to understand the technopolitical agendas that lay behind the initiatives taken by the NATO allies to connect and protect telecommunications within the alliance. This analytical approach is based on the recognition that technological systems are the results of a process in which different actors with different ambitions have contributed and choices have been made. By studying the role of telecommunications in NATO from the point of view of technopolitics, I have shown in chapter two and four how the allies' engagement with this area was

brought forward by different factors and how NATO's communication infrastructures developed in interaction with the strategic development of the alliance. In conclusion, I shall highlight three points related to this process.

First, the networking of NATO served the purpose of forming NATO as a political and material entity. As mentioned in the introduction, Daniel Headrick has framed telecommunications as a 'tool of empire' in his examination of the role of telecommunications in international politics in the late nineteenth and early twentieth centuries. Extending this observation to the Cold War period – although without further comparison – I suggest that within NATO, telecommunication was a 'tool of alliance'. Telecommunication infrastructures were a crucial component in the defence build-up that began in Western Europe in the late 1940s and accelerated greatly with the outbreak of the Korean War and the establishment of NATO's supreme allied command of Europe. In the context of military integration and collective defence build-up, telecommunications security in these years meant *connectivity*, and the need for major investments in communications infrastructure was widely accepted, although the concrete materialisation hereof also caused disputes. Later, when the NATO allies adopted the nuclear strategy in the mid-1950s and the strategy of flexible response in the late 1960s, both shifts entailed the adoption of new and highly advanced communications systems, and communications system-building played a vital role in the practical implementation of these strategies.

When bringing in the member state level, as I have done with the case of Denmark in this dissertation, it becomes evident how the construction of communication infrastructures helped materialise NATO on a national level. My examinations of Danish telecommunications in the 1950s in chapter three revealed how, due to the NATO membership, new infrastructural and organisational agendas were introduced into national communications system-building. In this way, the alliance also took form in material terms, as telecom sectors in the member states now had to take into consideration both the transnational links needed for NATO purposes and provided with common NATO funding and new needs for domestic and transnational communications for national defence purposes. This brings to mind a point put forward in recent research on European technology and infrastructure history, namely that the construction of border-crossing technological and infrastructural systems has played an important role for 'making Europe' by visualising or materialising Europe as an entity. Drawing on this, I suggest that a similar argument can be made in relation to communications infrastructures in NATO, namely that NATO was formed as a space through the communications system-building that I have studied in this dissertation. However, keeping in mind that infrastructures possess the ability to both link and de-link by crossing borders as well as creating new ones, it is important to

note that by furthering the networking of the NATO allies in Western Europe, NATO's cooperation on telecommunications also contributed to shaping the divided Europe.

Second, inspired by the research field of history of technology, the dissertation has studied NATO as a 'system-builder' in Western European telecommunications. What was needed within NATO was not just gateways that could provide interoperation between different systems, but instead a deeper integration of the national communications systems and the management hereof in wartime. It was, essentially, a national decision how such installations needed for military communications were to be constructed and managed, although this decision-making also involved a number of demands related to NATO's involvement in the construction of common infrastructure. Yet, NATO provided a forum for this transnational system-building to take place and paved the way for common funding hereof. In chapter two, I outlined how research into European telecommunications history in the early Cold War years has called attention to how the political push for European integration in the 1950s proved difficult to materialise in the area of telecommunications due to national tendencies of protectionism. These difficulties played a less significant role in NATO's transnational telecommunications system-building, which was deeply embedded in military and security agendas and took priority over civilian agendas in communications. However, national telecom actors such as the PTTs played a key role in NATO's system-building given their dominant positions, technical expertise, and experiences with transnational system-building. The system-builder perspective adds a new perspective to existing research on NATO in outlining how the defence build-up in Western Europe was not just a matter of strengthening military factors, but also one that involved many elements of the civil societies. I have shown with the Danish case how this had the consequence that the Danish tele sector became deeply involved in defence and security aspects of communications. While this task, by contrast, remained in military hands in Norway, it is still a topic for further exploration how this military networking process played out in other NATO countries and how it interacted with civilian agendas in the area of telecommunications.

In continuation hereof, my third point is that the networking of NATO also intertwined with other political and technological agendas. Most importantly, the communications system-building had to be balanced with general societal economic circumstances. As evident from chapter two, financial aspects were vital for communications planning from the outset in both WUDO and NATO. Since telecommunications were a very costly component in the defence build-up, the construction of cables and radio link installations connecting the European allies build upon the use of existing, national communications infrastructure operated by civilian communication

authorities – in Denmark the P&T and the three regional telephone companies. This civilian communications infrastructure continued to be the backbone of internal communications within NATO, even as more advanced systems only for military communications were taken in use, for which reason NATO's communications infrastructure in Western Europe can be understood as a 'layered' one. On a national level, the networking process also had to be balanced with general alliance political concerns. My examinations of the Danish context have revealed that more discussions between civilian and military stakeholders revolved around to what extent Danish solutions had to align with NATO standards – for instance the case with the disposal circuits that I examined in chapter six. The general tendency in such cases seems to be that it was considerations for Danish circumstances more than the NATO membership that guided the decisions taken in Denmark. While this can be understood as a particular Danish matter, it must also be taken into consideration that national PTTs in general had a strong position in Western European countries at this point, for which reason NATO's networking process relied closely on their expertise.

On a different note, but related to my third point, it is important to keep in mind that NATO's telecommunications system-building took place in the context of the Cold War competition between the two blocks. This became particularly evident in NATO with the introduction of satellite communications, which for the United States also served an external purpose by showing off the technological capabilities of the alliance to the rest of the world. Similar to the US attempts to promote specific technological and scientific agendas within NATO, as other historians such as John Krige and Simone Turchetti have documented, my study of the area of telecommunications has also revealed how the United States used soft power in the shape of providing technological knowledge and funding to the NATO allies. The balancing within NATO between different available technological systems is of particular importance in the area of communications, where historians such as Hugh Slotten and Jill Hills have outlined how the United States in the Cold War years challenged the pre-Second World War European dominance by furthering the spread of new technologies, e.g. satellite communications as an alternative to submarine and landline cables. However, my findings suggest that this strategy only succeeded to a certain extent, since it from the outset had been a deliberate strategy for more European allies, including Denmark, to base the alliance's communications on existing national capabilities.

II. Total war, nuclear threats, and the governance of telecommunications security

A second main aim of this dissertation has been to examine how telecommunications were governed in terms of security through the Cold War period in NATO and in Denmark. For this purpose, my engagement with the concept of security governance was motivated by the recognition that politics is not limited to political decision-making but comes into being in governance processes in which many stakeholders interact. In this dissertation, therefore, I have examined the security governance of telecommunications within NATO and in more detail in Denmark with a particular focus on tracing by whom and with what purpose this took place. I shall conclude this by highlighting three points.

First, in studying how the alliance's communications systems were problematised from the early 1950s onwards, I argue that the governance of telecommunications within NATO can overall be understood as dealing with two main purposes. On the one hand, NATO's agencies and member states sought to ensure that capacity in the existing networks would be sufficient for the defence of Europe in case of war. Special agencies were established for this purpose, namely the European Long Lines Agency and National Long Lines Agencies (NALLAs) in the member states, and within these agencies, a comprehensive task of registering circuits and practicing the management hereof in wartime was initiated. Thus, a central aspect of the governance of telecommunications was that of managing the networks with a view to wartime. This involved planning for redundancies and the balancing of military needs with other needs for communications deemed to be vital for societies in wartime. On the other hand, in response to the nuclear threat and the allies' increased focus on the mobilisation period of a future war, new perceptions of communications vulnerabilities emerged within the civil emergency planning committee in NATO. This can be understood as a response to a general political awareness towards upholding the home front, which was both a consequence of Second World War experiences and the threat scenarios related to a future war. On a national level, the collaboration in NATO on civil emergency planning introduced new security agendas into national telecommunications planning, e.g. the necessity to avoid urban areas as communication nodes. My examination of the planning for wartime telecommunications in Denmark in chapter five and six revealed that the NATO membership served as an important motive force for the initiation of many security measures in particular in the 1950s and early 1960s. As less attention was paid directly to the nuclear threat from the early 1960s onwards, new dimensions were added to the perceptions of communications vulnerability. Many of these were related to technological developments. For

instance, the automation of telecom services led to new concerns about how to avoid breakdown and how to manage border-crossing facilities in case of crisis or war.

However, when bringing the national level into the analysis, it appears that the security governance of telecommunications also intertwined with other developments in the telecom sectors. My examination of the Danish context shows how common standards etc. stemming from NATO agencies were in some cases applied in a Danish context, in some cases not. Accordingly, the NATO collaboration can mainly be understood as a catalyst for national developments in the way that it provided a framework and a number of standards upon which the national planning could be based. The Danish case suggests that from the early 1960s onwards, many of the topics that dominated the security governance of telecommunications were more often a response to national, sector-specific considerations. It must be noted, however, that this perhaps also reflects the circumstance that the source material available from the NATO Archives does not allow me to map out in detail which topics that were discussed among the allies in for instance ELLA and CCPC in the later Cold War years. Still, it appears from Danish material that many of the requests or initiatives related to telecommunications security from NATO were vaguely defined and set the stage for an implementation with a view to national circumstances. For instance, the NATO allies in Europe were requested to establish a NALLA and to take part in the international management of circuits in ELLA, but it was in the end a national choice how much effort that should be put into for instance exercise planning etc.

The second and third point that I wish to highlight concerns the Danish context more specifically. An important insight from my examination hereof is that the placing of responsibility of telecommunications security was increasingly transferred to civilian spheres. This was first and foremost in response to a political push for lowering defence expenditures and for placing security responsibilities among the actors also responsible for sectoral planning in peacetime. Moreover, it was also a consequence of the technological developments in communications leading to increased complexity, for which reason also security aspects hereof increasingly necessitated involvement of technical experts. The hybrid arrangement of the Danish telecom sector meant that many tasks related to telecommunications security in Denmark were carried out by the private, regional telephone companies, but as shown in chapter six, the involvement of private actors caused difficulties in cases where commercial agendas and national security agendas did not align. This is an important, but still unexamined aspect of the Cold War preparedness planning, both in Denmark and internationally, and my research suggests that further exploration of the involvement of private and semi-private actors in

preparedness is necessary for reaching a wider understanding of the Cold War state.

Third, my examinations of the Danish context have also demonstrated how the perception of what constituted a problem of telecommunications security was broadened through the Cold War period. What began in the 1950s as attempts to secure the telecommunications infrastructure against the nuclear threat evolved to be a complex security apparatus in which new security issues emerged out of the civil-military cooperation. In the preparations for war and critical situations, peacetime scenarios of technological breakdowns and the like also appeared as critical, and in this way, the imagination of breakdowns caused by different factors came to serve as a motive force in telecommunications planning. This is an important aspect of the governance of critical infrastructures, which has become a growing research field since critical infrastructure protection first appeared on political agendas in the 1990s. With reference to the argument made by the social scientists Collier and Lakoff that the Cold War was a pivotal moment in constituting system-vulnerability as an object of thought and total preparedness as a national security problem in its own right, my examinations have outlined in detail how vulnerabilities and preparedness planning came into being in a specific sector, namely telecommunications. I hereby add an important aspect to current understandings by showing how security governance did not only involve 'security thinkers' placed in central political agencies, e.g. those dealing with civil defence planning, but was also a result of sector-specific dynamics and technopolitical developments.

* * *

The dissertation demonstrates how the striving for 'nuclear-proof communications' is an important chapter in the history of telecommunications. Through the chapters, I have shown how a new security framework came to surround telecommunications in the Cold War period, adding new dimensions to telecommunications security in the shape of increased awareness around vulnerability, network capacity, and flexibility of communication facilities. In examining these aspects, the dissertation sheds new light to a theme, which has been dominant in communications since the nineteenth century – and also prior to that – namely the quest for reliability and security. In the Cold War era, this quest was redefined with reference to the concept of the total defence and, for the NATO allies, along the lines of the alliance membership.

The narrative of this dissertation concentrates on NATO's Western European spaces and the pitfall of doing so is that the importance of inner-western developments is perhaps overestimated. I have only very briefly

touched upon the governance of telecommunications linking with neutral and enemy states, as I demonstrated in chapter six how these links posed a problem in NATO's wartime planning. In peacetime, however, despite Cold War bloc politics, links with Warsaw Pact counties were extended through the Cold War period, for instance between Denmark and Poland and Denmark and the German Democratic Republic. Research into broadcasting and other communication means has shown how the Iron Curtain was bridged or perforated in different ways from a technological point of view.[711] The perforation of the iron curtain has also been studied in research on political Cold War history.[712] Thus, it is important to keep in mind that the Cold War security framework is not suitable for explaining everything and that bloc politics should not be exaggerated. Moreover, it is important to note that the security governance of telecommunications outlined in this dissertation should probably not be understood as a phenomenon limited to the NATO countries. To my knowledge, communication preparedness has not yet been examined in either other NATO countries or neutral ones, but previous research into civil defence issues during the Cold War has revealed how the reach hereof was immense in neutral countries like Sweden and Switzerland, and it is very probable that this also extended to communications.[713] Examinations of communications preparedness planning constitutes a fruitful topic for further exploration by historians.

My findings suggest that the international cooperation on communications within NATO is a fruitful field for further research. My examinations have paid particular attention to cases from the early Cold War period, as I have found it necessary to understand how and in which technopolitical context the system-building emerged. More material related to NATO's communications cooperation is likely to become available for researchers in the future. As my examinations have demonstrated, the defence cooperation in NATO reached well beyond defence areas and had wide implications also for civilian communications. It remains a topic for further exploration how this was dealt with in other national contexts than the Danish one and how for instance large private businesses took part in this project. Such examinations may not only reveal new aspects of Cold War preparedness planning on communications – as I have shown, approaching the topic of communications from the point of view of wartime planning can also more generally shed light on the role of telecommunications in modern societies and on internal dynamics within telecom sectors.

---

[711] See for instance Badenoch et al. eds., *Airy Curtains in the European Ether*.
[712] See for instance Villaume and Westad eds., *Perforating the Iron Curtain*.
[713] See for instance Ziauddin, "Superpower Underground"; Linnarsson, "Rayon för rikets försörjning"; Cronqvist, "Survival in the Welfare Cocoon".

This topic is not least relevant if we wish to reach a deeper understanding of the security problems related to information and communication technologies (ICT) today. After the end of the Cold War, ICT has gained importance as a new space of security governance. The cyber risk is often presented as one of the main security challenges of the twenty-first century. Facing asymmetrical threats like terrorist and hacker attacks, the cyber front has indeed become a 'first line of defence'. However, in scholarly as well as in popular debates, there is a tendency towards treating the cyber threat as a new phenomenon. Certainly, the development of a global and easily accessible World Wide Web since the end of the Cold War and the increasing interconnectedness of different infrastructures has brought along new risks and security challenges – not least for those societies, among them Denmark, that are front runners of digitisation. Moreover, the liberalisation of the area of communications – along with many other societal critical infrastructures like transport and postal matters – means that security governance of these sectors today involves a large number of private and multinational corporations. However, with this dissertation, I suggest that we need to apply a perspective of continuity on critical communication infrastructure protection in the twentieth and twenty-first century if we wish to understand how processes of security governance come into being and play out for critical infrastructures. With the prospect of an all-encompassing total war, the Cold War period was decisive for placing communications infrastructures at the very centre of the security apparatus of the modern state.

Summary

The PhD dissertation *Nuclear-proof communications?* examines how the Cold War brought about a new security framework in the area of telecommunications. The dissertation explores different efforts to provide secure telecommunications in two, interconnected contexts, NATO and one of the member states, Denmark, from the late 1940s through to the 1980s. Drawing on the concept of technopolitics, the dissertation asks how different efforts to connect and protect telecommunications in NATO and Denmark were shaped by both technological and political factors. Moreover, the dissertation engages with the concept of security governance in order to examine how telecommunications were governed in terms of security, not only by politicians, but in a dynamic interplay between different stakeholders – among them NATO committees, military authorities, the P&T, and the Danish telephone companies.

Historically, the governance of telecommunications security prior to the Cold War revolved around physical protection of facilities or control of information flows and was targeted against enemy interception, sabotage, or propaganda. Based on investigations of archive material from NATO and Denmark, this dissertation shows how both political and technological developments in the Cold War necessitated a new kind of security governance of the area of telecommunications. First, the dissertation examines the role ascribed to communication infrastructures in the international defence cooperation that emerged among the NATO allies and in the strategic development that the alliance went through in the Cold War period. In doing so, it shows how the cooperation on both military and civilian communications was a tool of alliance in the sense that it formed NATO as a political and material entity. Since NATO's communications rested on national communication resources, national tele administrations in Western Europe became involved in transnational system-building. In Denmark, this led to a number of dilemmas on how to balance civilian and military needs and provided opportunities for prioritising civilian aspects in the defence build-up.

Second, by exploring in detail the immense preparedness planning that took place in the area of telecommunications in Denmark, the dissertation documents how Cold War threat scenarios became a motive force for technological and organisational developments in communications. New perceptions of vulnerability, directly catalysed by the NATO membership, were added to communications planning in response to the nuclear threat, but over time the perception of vulnerabilities was broadened to include many peacetime scenarios too. In this way, the governance of telecommunications security extended beyond security challenges directly related to the Cold War.

Dansk resumé

Ph.d.-afhandlingen *Nuclear-proof communications?* undersøger, hvordan Den Kolde Krig bibragte telekommunikationsområdet en ny sikkerhedspolitisk dimension. Dette gøres ved at analysere forskellige forsøg på at sikre kommunikationsfaciliteterne i NATO og i et af NATO's medlemslande, Danmark, fra slutningen af 1940erne og frem til 1980erne. Ved hjælp af begrebet 'technopolitics' spørger afhandlingen, hvordan en række tiltag til at forbinde og beskytte telekommunikationerne i NATO og Danmark var formet af både teknologiske og politiske faktorer. Afhandlingen benytter desuden begrebet 'security governance' til at udforske, hvordan den sikkerhedspolitiske håndtering af telekommunikationsområdet ikke blot blev til af politikere, men i et dynamisk samspil mellem forskellige aktører – deriblandt NATO-komitéer, militære myndigheder, P&T og de danske telefonselskaber.

I perioden frem til Den Kolde Krig drejede telekommunikationssikkerhed sig primært om fysisk sikring af faciliteter eller om kontrol over informationsstrømme og var rettet mod fjendtlig aflytning, sabotage eller propaganda. På baggrund af undersøgelser af arkivmateriale fra NATO og Danmark viser denne afhandling, hvordan både politiske og teknologiske udviklinger i Den Kolde Krig nødvendiggjorde nye sikkerhedsmæssige håndteringer af teleområdet. For det første undersøges den rolle, som kommunikationsinfrastrukturer blev tiltænkt i det internationale forsvarssamarbejde, der opstod blandt de NATO-allierede og i den strategiske udvikling, som alliancen gennemgik. Hermed argumenterer afhandlingen for, at samarbejdet om både militære og civile kommunikationer var et 'tool of alliance' i den forstand, at det formede NATO som en politisk og materiel enhed. Idet NATO's kommunikation var baseret på nationale ressourcer, blev nationale teleadministrationer i Vesteuropa dybt involveret i transnational 'system-building'. I Danmark medførte dette en række dilemmaer omhandlende balanceringen af civile og militære kommunikationsbehov, men det åbnede også muligheder for at prioritere civile aspekter som en del af den omfattende forsvarsopbygning.

For det andet viser afhandlingen via en grundig udforskning af beredskabsplanlægningen på teleområdet i Danmark, hvordan Den Kolde Krigs trusselsscenarier blev en drivkraft for både teknologiske og organisatoriske udviklinger på teleområdet. Som konsekvens af atomtruslen – og direkte foranlediget af NATO-medlemsskabet – blev nye opfattelser af sårbarhed tænkt ind i kommunikationsplanlægningen, men over tid blev opfattelsen af sårbarhed udvidet til også at inkludere mange fredstidsscenarier. På denne måde rakte den sikkerhedspolitiske styring af teleområdet ud over sikkerhedsmæssige udfordringer direkte relateret til Den Kolde Krig.

Source material

NATO Archives (NA)

In the document IDs, D refers to documents, M to memoranda, N to notes, and R to records.

- AC/4: Infrastructure Committee
- AC/29: Working Group on Definition of Common Infrastructure
- AC/98: Senior Civil Emergency Planning Committee
- AC/109: Working Group on Wartime International Communication Requirements
- AC/121: Civil Communications Planning Committee
- C: The North Atlantic Council
- D: North Atlantic Council Deputies
- DPC: Defence Planning Committee
- IMS: International Military Staff
- MC: The Military Committee
- LOCO: Liaison Office Communication
- LO: Standing Group Liaison Office Paris
- PDD: Public Diplomacy Division / NATO Information Service
- SG: The Standing Group
- SHAPE Histories

  Available from https://www.nato.int/cps/en/natohq/91523.htm
  - "SHAPE History Volume I", 1953
  - "SHAPE History Volume II", c. 1953.
  - "SHAPE History – The New Approach (1953-1956)", c. 1956.
  - "SHAPE History – 1957", 1957.
  - "SHAPE History – 1958", 1958.

NATO E-Library (NA-E)

- Official texts: https://www.nato.int/cps/su/natohq/official_texts.htm

Rigarkivet / Danish National Archives (RA)

- Forsvarsministeriet (FM)
- Indenrigsministeriet (IM)
- IT- og Telestyrelsen (ITTS)
- Jydsk Telefon-Aktieselskab (JTAS)
- Ministeriet for Offentlige Arbejder (MOA)
- Trafikministeriet (TM)
- Udenrigsministeriet (UM)
- Økonomiministeriet (ØM)

ENIGMA Archives (EA)

The History of ITU Portal (ITU-H)
Available at: https://www.itu.int/en/history/Pages/Home.aspx

Foreign Relations of the United States (FRUS)
Available at: https://history.state.gov/historicaldocuments

- FRUS 1948 Volume III
- FRUS 1950 Volume I and III
- FRUS 1951 Volume III

Published Danish material

- Ugeskrift for Retsvæsen
- Rigsdagstidende
- Folketingstidende
- Weekendavisen
- Berlingske Tidende

National Archives, The United Kingdom

- The Ministry of Defence: DEFE 5 – Chiefs of Staff Committee: Memoranda

Literature

Abbate, Janet, *Inventing the Internet* (Cambridge, Massachusetts: The MIT Press, 1999).

Agger, Jonathan Søborg and Lasse Wolsgård, "All Steps Necessary: Danish Nuclear Policy, 1949-1960", *Contemporary European History* 15:1 (2006), 67-84.

Aid, Matthew M., "In the Right Place at the Right Time: US Signals Intelligence Relations with Scandinavia, 1945-1960", *The Journal of Strategic Studies* 29:4 (2006), 575 – 605.

Aid, Matthew M. and Cees Wiebes, "Introduction on The Importance of Signals Intelligence in the Cold War", *Intelligence and National Security* 16:1 (2001), 1-16.

Andersen, K. Vogt., "Teleberedskab", *Civilforsvar* 3 (1980), 22-23.

Andersen, Michael Moesgaard, *Omstillingen er klar... Dansk telehistorie og det statslige tilsyns placering* (København: Poul Selvig ApS, 1986).

Andersen, Steen, "Erhvervslivet", in *Den Kolde Krig og Danmark. Gads Leksikon*, eds. John T. Lauridsen, et al. (København: Gads Forlag, 2011), 214-217.

Aradau, Claudia, "Discourse/materiality", in *Critical Security Methods: New Frameworks for Analysis*, eds. Claudia Aradau, et al. (London and New York: Routledge, 2015).

——, "Infrastructure", in *Research Methods in Critical Security Studies. An Introduction*, eds. Mark B. Salter and Can E. Mutlu (London and New York: Routledge, 2013).

——, "Security that Matters. Critical Infrastructure and Objects of Protection", *Security Dialogue* 41:5 (2010), 491-514.

Aradau, Claudia, Jef Huysmans, Andrew Neal and Nadine Voelkner, "Introducing Critical Security Methods", in *Critical Security Methods: New Frameworks for Analysis*, eds. Claudia Aradau, et al. (London and New York: Routledge, 2015), 1-22.

Aronova, Elena and Simone Turchetti, "Introduction: Science Studies in East and West - Incommensurable Paradigms?", in *Science Studies during the Cold War and Beyond: Paradigms Defected*, eds. Elena Aronova and Simone Turchetti (New York: Palgrave Macmillan, 2016), 1-20.

Badenoch, Alexander and Andreas Fickers, "Europe Materializing? Toward a Transnational History of European Infrastructures", in *Materializing Europe: Transnational Infrastructures and the Project of Europe* (Basingstoke, Hampshire: Palgrave Macmillan, 2010).

Badenoch, Alexander, Andreas Fickers and Christian Henrich-Franke, eds.,*Airy Curtains in the European Ether. Broadcasting and the Cold War*, Schriftenreihe des Instituts für Europäische Regionalforschungen (Baden-Baden: Nomos Verlagsgesellschaft, 2013).

Balbi, Gabiele, "Telecommunications", in *Handbook of Communication History*, eds. Simonson, et al. (London and New York: Routledge, 2013), 209-222.

Balbi, Gabriele and Richard R. John, "Point-to-point: telecommunications networks from the optical telegraph to the mobile telephone", in *Communication and Technology*, eds. Lorenzo Cantoni and James A. Danowski (Berlin and Boston: De Gruyter, Inc., 2015), 35-55.

Baran, Paul, "On Distributed Communications. Introduction to Distributed Communications Networks", (Santa Monica, California, 1964).

Beredskabsstyrelsen, "Beredskabsloven – med ændringer og forarbejder", https://brs.dk/viden/publikationer/Documents/beredskabsloven%202011.pdf, accessed August 28, 2018 (Birkerød: Beredskabsstyrelsen, uddated).

Bergsøe, Morten, "Hvis krigen kommer - til Vejle", in *Vejlebogen. Årbog for Byhistorisk Selskab for Vejle* (Vejle: Byhistorisk Selskab for Vejle, 2012), 111-118.

Beyersdorf, Frank, "Freedom of Communication: Visions and Realities of Postwar Telecommunication Orders in the 1940s", *The Journal of Policy History* 27:3 (2015), 492-520.

Birch, Kaare, *Linjer af Jydsk Telefons 100 årige historie* (Jydsk Telefon, 1995).

Blüdnikow, Bent, *Enhedsvæsenet - og andre telefoniske fabeldyr. Samarbejde og tilsyn fra den første telefon til Tele Danmark*: Telestyrelsen, 1996).

——, *Post og Tele under samme tag. P&Ts historie 1927-1960* (København: Generaldirektoratet for Post- og Telegrafvæsenet, 1993).

Boje, Per, Marianne Rostgaard and Mogens Rüdiger, *Handelspolitikken som kampplads under Den Kolde Krig* (Aalborg: Aalborg Universitetsforlag, 2012).

Bozo, Frédéric, "Defense Versus Security? Reflections on the Past and Present of the "Future Tasks" of the Alliance (1949-99)", in *A History of NATO: The First Fifty years. Vol. II*, ed. Gustav Schmidt (Basingstoke: Palgrave, 2001), 65-80.

Bramslev, G., "Radiotelegrafi og radiofoni", in *Bogen om post og tele*, eds. A. Morell Nielsen, et al. (København: Politikens Forlag, 1974), 355-375.

Bruton, Elizabeth, "The Cable Wars. Military and State Surveillance of the British Telegraph Cable Network During World War One", in *Historicizing Infrastructure*, eds. Andreas Marklund and Mogens Rüdiger (Aalborg: Aalborg University Press, 2017), 159-182.

Butler, William Elliott, ed.*A Source Book on Socialist International Organizations* (Alphen aan den Rijn: Sijthoff & Noordhoff, 1978).

C3I, "NICS (NATO Integrated Communications System)", https://www.forecastinternational.com/archive/disp_old_pdf.cfm?ARC_ID=242 (1997), accessed January 14.

Calleo, David, *The Atlantic Fantasy: Ths U.S., NATO, and Europe* (Baltimore and London: Johns Hopkins Press, 1970).

Cantoni, Roberto, "What's in a Pipe?: NATO's Confrontation on the 1962 Large-Diameter Pipe Embargo", *Technology and Culture* 58:1 (2017), 67-96.

Carr, Madeleine, "Public-private partnerships in national cyber-security strategies", *International Affairs* 92:1 (2016), 43-62.

Carter, Ashton B., "Communications Technologies", in *Managing Nuclear Operations*, eds. Ashton B. Carter, et al. (Washington, D.C.: The Brookings Institution, 1987), 217-281.
Cavelty, Myriam Dunn and Manuel Suter, "Public-private partnerships are no silver bullet: an expanded governance model for critical infrastructure protection", *International Journal of Critical Infrastructure Protection* 2:4 (2009), 179-187.
CEPT, "Background", https://cept.org/cept/background, accessed May 21, 2018.
CFCS, *Trusselsvurdering: Cybertruslen mod Danmark* (København: Trusselsvurderingsenheden ved Center for Cybersikkerhed, Forsvarets Efterretningstjeneste, Maj 2018).
Christensen, Arne Berner, *Fra morsenøgle til datanet. Flyvevåbnets Signaltjeneste gennem et halvt århundrede* (Denmark: No publisher, 1996).
Christensen, Ivan Lind and Christian Ydesen, "Internationale Organisationers Virkningshistorie. Teoretiske og metodiske overvejelser", *Temp - Tidsskrift for historie* 5:10 (2015), 16-33.
Christensen, Kristoffer Kjærgaard, *Corporate Zones of Cyber Security*. PhD Dissertation (Department of Political Science, Faculty of Social Sciences, University of Copenhagen, 2018).
Christensen, Kristoffer Kjærgaard and Karen Lund Petersen, "Public–private partnerships on cyber security: a practice of loyalty", *International Affairs* 93:6 (2017), 1435–1452.
Clavin, Patricia, "Defining Transnationalism", *Contemporary European History* 14:4 (2005), 421-439.
Codding, George A., *The International Telecommunication Union: An Experiment in International Cooperation* (Leiden: E.J. Brill, 1952).
Cole, Brigadier, "Signal communications in NATO", *The Fifteen Nations* 2 (1956), 61-64.
Collier, Stephen J. and Andrew Lakoff, "Distributed Preparedness: The Spatial Logic of Domestic Security in the United States", *Environment and Planning D: Society and Space* 26:1 (2008), 7-28.
——, "The Vulnerability of Vital Systems: How 'critical infrastructure' became a security problem", in *Securing 'the Homeland': critical infrastructure, risk and (in)security*, eds. Myriam Dunn Cavelty and Kristian Søby Kristensen (London: Routledge, 2008), 17-39.
Cronqvist, Marie, "Survival in the Welfare Cocoon. The Culture of Civil Defense in Cold War Sweden", in *Cold War Cultures. Perspectives on Eastern and Western European Societies*, eds. Anette Vowinckel, et al. (New York and Oxford: Berghahn Books, 2012), 191-210.
——, "Utrymning i folkhemmet. Kalla kriget, välfärdsidyllen och den svenska civilförsvarskulturen 1961", *Historisk Tidsskrift (Sweden)* 128:3 (2008), 451-476.
Davids, Mila, "European Co-operation in Telecommunications and the Dutch PTT (1950s-1980s)", in *Business and European Integration since 1800. Regional, National and International Perspectives*, ed. Ulf Olsson (Göteborg: Göteborg University Press, 1997), 357-377.

Davis, Tracy C., *Stages of Emergency. Cold War Nuclear Civil Defense* (Durham and London: Duke University Press, 2007).
DIIS, *Danmark under Den Kolde Krig. Den Sikkerhedspolitiske Situation 1945-1991*. Vol. 1-4 (København: Dansk Institut for Internationale Studier, 2005).
Dingman, James E., "Communications in the Nuclear Age", *SIGNAL. Journal for the Armed Forces Communications Association* June (1957), 7-9.
Dizard, Jr., Wilson, *Digital Diplomacy. U.S. Foreign Policy in the Information Age* (Westport and London: Praeger, 2001).
Doel, Ronald E, "Scientists as Policymakers, Advisors, and Intelligence Agents: Linking Contemporary Diplomatic History with the History of Contemporary Science", in *The Historiography of Contemporary Science and Technology*, ed. Thomas Söderqvist (Amsterdam: Harwood Acedemic Publishers, 1997), 215-244.
Duedahl, Poul and Karen Gram-Skjoldager, "De Internationale Organisationers Danmarkshistorie. En introduktion", *Temp - Tidsskrift for historie* 5:10 (2015), 5-15.
Edgerton, David, *The Schock of the Old: Technology and Global history Since 1900* (London: Profile Books, 2008).
——, *Warfare State: Britain, 1920-1970* (Cambridge: Cambridge University Press, 2006).
Edwards, Paul N., *The Closed World: Computers and the Politics of Discourse in Cold War America* (Cambridge, Massachusetts: The MIT Press, 1996).
——, "Infrastructure and Modernity: Force, Time, and Social Organization in the History of Sociotechnical Systems", in *Modernity and Technology*, eds. Thomas J. Misa, et al. (Cambridge, Massachusetts: The MIT Press, 2004), 185-225.
——, *A Vast Machine: Computer Models, Climate Data, and the Politics of Global Warming* (Cambridge, Massachusetts: The MIT Press, 2010).
Egilsson, Haraldur Þór, "The Origins, Use and Development of Hot Line Diplomacy", *Discussion Papers in Diplomacy* (2003).
Egyedi, Tineke M., Donna C. Mehos and Wim G. Vree, "Introducing Inverse Infrastructures", in *Inverse Infrastructures: Disrupting Networks from Below*, eds. Tineke M. Egyedi and Donna C. Mehos (Cheltenham, UK and Northampton, Massachusetts: Edward Elgar, 2012), 1-16.
Eliassen, Kjell A., Toby Mason and Marit Sjøvaag, "European telecommunications policies - deregulation, re-regulation or real liberalisation?", in *European Telecommunications Liberalisation*, eds. Kjell A. Eliassen and Marit Sjøvaag (London and New York: Routledge, 1999), 16-26.
Eliassen, Kjell A. and Marit Sjøvaag, eds.,*European Telecommunications Liberalisation* (London and New York: Routledge, 1999).
Erickson, Christian W. and Bethany A. Barrat, "Prudence or Panic? Preparedness Exercises, Counterterror Mobilization, and Media

Coverage - Dark Winter, TOPOFF 1 and 2", *Journal of Homeland Security* 1:4 (2004).
Espeli, Harald, *Det statsdominerte teleregimet 1920-1970*. Vol. Bind II, Norsk Telekommunikasjonshistorie (Oslo: Gyldendal Norsk Forlag, 2005).
Fickers, Andreas and Pascal Griset, *Communicating Europe. Technologies, Information, Events*, Edited by Johan Schot and Philip Scranton, Making Europe: Technology and Transformations, 1850-2000 (Basingstoke and New York: Palgrave Macmillan, 2018 (Forthcoming)).
Fossat, Sissel Bjerrum, Anne Magnussen, Klaus Petersen and Nils Arne Sørensen, "Transnational historie", in *Transnationale Historier*, eds. Sissel Bjerrum Fossat, et al. (Odense: Syddansk Universitetsforlag, 2009).
Fridlund, Mats, "Buckets, bollards and bombs: towards subject histories of technologies and terrors", *History and Technology* 27:4 (2011), 391-416.
Gaddis, John Lewis, *We Now Know: Rethinking Cold War History* (Oxford: Oxford University Press, 1997).
Galambos, Louis, ed. *The Papers of Dwight David Eisenhower. NATO and the Campaign of 1952: XII* (Baltimore and London: Johns Hopkins University Press, 1989).
Garrison, Dee, *Bracing for Armageddon: Why Civil Defense Never Worked* (Oxford: Oxford University Press, 2006).
Gough, Jack, *Watching the Skies: The History of Ground Radar in the Air Defence of the United Kingdom* (London: HMSO, 1993).
Grant, Matthew, *After the Bomb: Civil Defence and Nuclear War in Britain, 1945-68* (Basingstoke: Palgrave Macmillan, 2009).
Gregory, Shaun R., *Nuclear Command and Control in NATO: Nuclear Weapons Operations and the Strategy of Flexible Response* (Basingstoke and London: Macmillan Press, 1996).
Greiner, Christian, Klaus A. Maier and Heinz Rebhan, *Die NATO als Militärallianz*, Edited by Militärgeschichtliches Forschungsamt. Vol. 4, Entstehung und Probleme des Atlantischen Bündnisses, 2003).
Hamblin, Jacob Darwin, "Environmentalism for the Atlantic Alliance: NATO's Experiment with the 'Challenges of Modern Society'", *Environmental History* 15 (2010), 54-75.
Hanhimäki, Jussi and Odd Arne Westad, eds., *The Cold War. A History in Documents and Eyewitness Accounts* (Oxford: Oxford University Press, 2003).
Hansen, Lene and Helen Nissenbaum, "Digital Disaster, Cyber Security, and the Copenhagen School", *International Studies Quarterly* 53 (2009), 1155-1175.
Hatzivassiliou, Evanthis, *NATO and Western Perceptions of the Soviet Bloc: Alliance Analysis and Reporting, 1951-69* (London and New York: Routledge, 2014).
——, *The NATO Committee on the Challenges of Modern Society, 1969–1975. Transatlantic Relations, the Cold War and the Environment*,

Edited by Effie G. H. Pedaliu and John W. Young, Security, Conflict and Cooperation in the Contemporary World (London: Palgrave Macmillan, 2017).
Headrick, Daniel R., *The Invisible Weapon. Telecommunications and International Politics 1851-1946* (Oxford: Oxford University Press, 1991).
——, "Strategic and Military Aspects of Submarine Telegraph Cables, 1851–1945", in *Communications Under the Seas: The Evolving Cable Network and Its Implications*, eds. Bernard Finn and Daqing Yang (Cambridge, Massachusetts: The MIT Press, 2009).
——, *The Tools of Empire: Technology and European Imperialism in the Nineteenth Century* (Oxford: Oxford University Press, 1981).
Headrick, Daniel R. and Pascal Griset, "Submarine Telegraph Cables: Business and Politics, 1838-1939", *The Business History Review* 75:3 (2001), 543-578.
Hecht, Gabrielle, "Introduction", in *Entangled Geographies: Empire and Technopolitics in the Global Cold War* (Cambridge, Massachusetts: The MIT Press, 2011), 1-12.
——, *The Radiance of France. Nuclear Power and National Identity after World War II* (Cambridge, Massachusetts: The MIT Press, 1998).
Hecht, Gabrielle and Paul N. Edwards, "The Technopolitics of the Cold War. Towards a Transregional Perspective", in *Essays on Twentieth-Century History*, ed. Michael Adas (Philadelphia: Temple University Press, 2010).
Hennessy, Peter, *The Secret State: Preparing for the Worst, 1945-2010*, 2nd ed. ed (London: Penguin, 2010).
Henrich-Franke, Christian, "Comparing Cultures of Expert Regulation: Governing Cross-Border Infrastructures", *Contemporary European History* 27:2 (2018), 280-300.
——, "Die Gründing europäischer Infrastrukturorganisationen im Ost/West-Vergleich: Die PTT-Organisationen OSS und CEPT", in *Infrastrukturintegration und internationale Politik*, eds. Gerold Ambrosius, et al. (Baden-Baden: Nomos, 2010), 145-174.
Henten, Anders, *100 års telefonlov: Universel service i Danmark* (Lyngby: Center for Tele-Information, Danmarks Tekniske Universitet, 1997).
——, "Dansk telefonhistorie - en kort tematisk oversigt", *CTI Working Paper* 98 (2005).
Hertz, Michael, "Ministeriet for Offentlige Arbejder", http://denstoredanske.dk/index.php?sideId=125963, accessed June 2 2018.
Heurlin, Bertel, "Forsvarskommandoen", in *Den Kolde Krig og Danmark. Gads Leksikon*, eds. John T. Lauridsen, et al. (København: Gads Forlag, 2011), 268-271.
Hills, Jill, *The Struggle for Control of Global Communication: The formative Century* (Champaign: University of Illinois Press, 2002).
——, *Telecommunications and Empire* (Champaign: University of Illinois Press, 2007).

——, "What's New? War, Censorship and Global Transmission. From the Telegraph to the Internet", *The International Communication Gazette* 68:3 (2006), 195-216.
Holmblad, N.E., "Koaksialkabelanlægget Danmark-Holland", *Teleteknik* X:X (1953), 1-13.
Hommels, Anique, Per Högselius, Arne Kaijser and Erik van der Vleuten, "Europe's Infrastructure Vulnerabilities: Comparisons and Connections", in *The Making of Europe's Critical Infrastructure. Common Connections and Shared Vulnerabilities*, eds. Per Högselius, et al. (Basingstoke: Palgrave Macmillan, 2013), 263-277.
Hufty, Marc, "Investigating Policy Processes: The Governance Analytical Framework (GAF)", in *Research for Sustainable Development: Foundations, Experiences, and Perspectives*, eds. Urs Wiesmann and Hans Hurni (Bern: Geographica Bernensia, 2011), 403–424.
Hughes, Thomas P., "The Evolution of Large Technical Systems", in *The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology*, eds. Wiebe Bijker, et al. (Cambrigde, Massachusetts: The MIT Press, 1987), 51-82.
——, *Networks of Power: Electificaion in Western Society, 1880-1930* (Baltimore: The Johns Hopkins University Press, 1983).
Hugill, Peter J. , *Global Communications Since 1844: Geopolitics and Technology* (Baltimore and London: Johns Hopkins University Press, 1999).
Huurdeman, Anton A., *The Worldwide History of Telecommunications* (Hoboken, New Jersey: John Wiley & Sons, Inc., 2003).
Högselius, Per, Anique Hommels, Arne Kaijser and Erik van der Vleuten, eds., *The Making of Europe's Critical Infrastructure. Common Connections and Shared Vulnerabilities* (Basingstoke: Palgrave Macmillan, 2013).
Högselius, Per, Arne Kaijser and Erik van der Vleuten, *Europe's Infrastructure Transition: Economy, War, Nature*, Edited by Johan Schot and Philip Scranton, Making Europe: Technology and Transformations, 1850-2000 (Basingstoke and New York: Palgrave Macmillan, 2016).
Høj, Tobias Juel , Andreas Lie Stokbro and Bjarke Rimmen Noe, *Tryghed på tryk. Det danske presseberedskab under Den Kolde Krig*. Unpublished Master's Thesis (Aalborg University, Institut for Kultur og Globale Studier, 2017).
Ibsen, Christian Lyhne and Lauge Skovgaard Poulsen, "Path dependence and independent utility regulation: The case of Danish energy and telecommunications regulation", *Scandinavian Economic History Review* 55:1 (2007), 41-63.
Immerman, Richard H. and Petra Goedde, "Introduction", in *The Oxford Handbook of the Cold War*, eds. Richard H. Immerman and Petra Goedde (Oxford: Oxford University Press, 2013).
Ireland, Timothy P., *Creating the entangling alliance: The origins of the North Atlantic Treaty Organization* (London: Aldwych Press, 1981).

Iriye, Akira, "Historicizing the Cold War", in *The Oxford Handbook of the Cold War*, eds. Richard H. Immerman and Petra Goedde (Oxford: Oxford University Press, 2013), 15-31.
Iriye, Akira and Pierre-Yves Saunier, eds., *The Palgrave Dictionary of Transnational History: From the mid-19th century to the present day* (Basingstoke, Hampshire: Palgrave Macmillan, 2009).
Ismay, Lord, *NATO. The First Five years* (Utrecht: Bosch Dat, 1954).
ITU, "CCITT 50 Years 1956-2006", https://www.itu.int/ITU-T/50/docs/ITU-T_50.pdf (2006), accessed March 5, 2018.
Jackson, Steven J., "Rethinking Repair", in *Media Technologies: Essays on Communication, Materiality, and Society*, eds. Tarleton Gillespie, et al. (Cambridge, Massachusetts: The MIT Press, 2014), 221-239.
Jackson, Steven J., Paul N. Edwards, Geoffrey C. Bowker and Cory P. Knobel, "Understanding Infrastructure: History, Heuristics, and Cyberinfrastructure Policy", *First Monday* 12:6 (2007).
Jacobsen, Kurt, *Jydsk Telefon. "Verdens bedste telefonselskab"*, Skrifter fra Post &Tele Museum 5 (København: Post og Tele Museum, 2004).
——, "Small Nation, International Submarine Telegraphy, and International Politics: The Great Northern Telegraph Company, 1869-1940", in *Communications Under the Seas: The Evolving Cable Network and Its Implications*, eds. Bernard Finn and Daqing Yang (Cambridge, Massachusetts: The MIT Press, 2009), 115-157.
Jeding, Carl, "National politics and international agreements: British strategies in European telephony, 1932-39", in *Working Papers in Transport and Communication History*: Umeå University and Uppsala University, 1998).
Jeding, Carl, Jan Ottosson and Lars Magnusson, "Regulatory change and international co-operation: The Scandinavian Telecommunication Agreements, 1900–1960", *Scandinavian Economic History Review* 47:2 (1999), 63-77.
Jensen, Bent, *Bjørnen og haren. Danmark og Sovjetunionen 1945-65* (Odense: Syddansk Universitetsforlag, 1999).
——, *Ulve, Får og Vogtere. Den Kolde Krig i Danmark 1945-1991*. Vol. 1 (København: Gyldendal, 2014).
——, *Ulve, Får og Vogtere. Den Kolde Krig i Danmark 1945-1991*. Vol. 2 (København: Gyldendal, 2014).
Jensen, Leon Dalgas, "Dansk forsvar og Marshallplanen 1947-1960", *Historisk Tidsskrift* 91 (1991), 459-506.
——, "Det Forsvarsøkonomiske Udvalg", in *Den Kolde Krig og Danmark. Gads Leksikon*, eds. John T. Lauridsen, et al. (København: Gads Forlag, 2011), 459-506.
——, "Marshallplanen", in *Den Kolde Krig og Danmark. Gads Leksikon*, eds. John T. Lauridsen, et al. (København: Gads Forlag, 2011), 421-424.
——, "NATO og danske økonomisk-politiske interesser 1949-56", in *Danmark, Norden og NATO 1948-1962*, eds. Carsten Due-Nielsen, et al. (København: Jurist- og Økonomforbundets Forlag, 1991).

Jensen, Sanne Aagaard, "Connecting the Alliance: Communications Infrastructure on the NATO Agenda in the 1950s", in *Historicizing Infrastructure*, eds. Andreas Marklund and Mogens Rüdiger (Aalborg: Aalborg University Press, 2017), 183-210.

——, *Klartone efter atombomben. Danmark, NATO og det civile-militære samarbejde på telekommunikationsområdet, 1949-1962*. Unpublished Master's Thesis (University of Copenhagen, Department of History, 2013).

Jessen, P.O.H., "Nogle betragtninger vedrørende fremføringsveje for permanente telekommunikationer", *Ingeniøren* 64:43 (1955), 847-849.

——, "Nogle betragtninger vedrørende fremføringsveje for permanente telekommunikationer", *Ingeniøren* 66:28 (1957), 749-752.

Johansen, Hans Chr., *Fra monopol til konkurrence. P&Ts historie fra 1960* (København: Generaldirektoratet for Post- og Telegrafvæsenet, 1993).

Jordan, Robert S., *The NATO International Staff/Secretariat 1952-1957. A Study in International Administration* (London: Oxford University Press, 1967).

Judt, Tony, *Postwar. A History of Europe since 1945* (London: Vintage Books, 2010).

Jørgensen, Steffen Elmer, "Velfærdsstaten sættes på hjul. Om langsigtet trafikplanlægning i 1950'erne, dens forudsætninger og dens følger for dagens Danmark", in *Samfundsplanlægning i 1950'erne: Tradition eller tilløb?*, eds. Else Hansen and Leon Jespersen (København: Museum Tusculanums Forlag, 2009), 77-152.

Kaiser, Wolfram and Johan Schot, *Writing the Rules for Europe. Experts, Cartels, and International Organizations*, Edited by Johan Schot and Philip Scranton, Making Europe: Technology and Transformations, 1850-2000 (Basingstoke and New York: Palgrave Macmillan, 2014).

Kaldor, Mary and Iavor Rangelov, "Introduction: Global Security Policy in the Twenty-First Century", in *The Handbook of Global Security Policy* (Chichester: John Wiley & Sons Ltd, 2014), 1-8.

Kaplan, Lawrence S., *A community of interests: NATO and the military assistance program, 1948-1951* (Washington, D.C: Office of the Secretary of Defense, Historical Office, 1980).

——, *The Long Entanglement: NATO's First Fifty Years* (Westport, CT and London: Praeger, 1999).

——, *NATO Divided, NATO United: The Evolution of an Alliance* (Westport: Praeger Publishers, 2004).

——, *The United States and NATO. The Formative Years* (Lexington: The University of Kentucky Press, 1984).

Kelleher, Catherine McArdle, "NATO Nuclear Operations", in *Managing Nuclear Operations*, eds. Ashton B. Carter, et al. (Washington, D.C.: The Brookings Institution, 1987), 445-469.

Knudsen, Henrik and Henry Nielsen, "Naturvidenskab i Danmark under Den Kolde Krig", in *Den Kolde Krig og Danmark. Gads Leksikon*, eds. John T. Lauridsen, et al. (København: Gads Forlag, 2011), 449–453.

Krahmann, Elke, "Conceptualizing Security Governance", *Cooperation and Conflict* 38:1 (2003), 5-26.
Krige, John, *American Hegemony and the Postwar Reconstruction of Science in Europe*, Transformations: studies in the history of science and technology (Cambridge, Massachusetts: The MIT Press, 2006).
——, "NATO and the Strengthening of Western Science in the Post-Sputnik Era", *Minerva* 38:1 (2000), 81-108.
——, *Sharing knowledge, Shaping Europe: US Technological Collaboration and Nonproliferation*, Transformations: studies in the history of science and technology (Cambridge, Massachusetts: The MIT Press, 2016).
KTAS, *KTAS i hundrede år* (København: KTAS, 1981).
Kaarsted, Tage, *De Danske Ministerier 1929-1953. Et hundrede politisk-hisoriske biografier* (København: Pensionsforsikringsanstalten, 1977).
——, *De Danske Ministerier 1953-1972* (København: PFA Pension, 1992).
Laborie, Léonard, "Enveloping Europe: Plans and Practices in Postal Governance, 1929-1959", *Contemporary European History* 27:2 (2018), 301-325.
——, "Fragile links, frozen identities: the governance of telecommunication networks and Europe (1944-53)", *History and Technology* 27:3 (2011), 311-330.
——, *L'Europe mise en réseaux. La France et la coóperation internationale dans les postes et les télécommunications (années 1850-années 1950)* (Bruxelles: P.I.E. Peter Lang, 2010).
——, "A Missing Link? Telecommunications Networks and European Integration 1945-1970", in *Networking Europe. Transnational Infrastructures and the Shaping of Europe, 1850-2000*, eds. Erik van der Vleuten and Arne Kaijser (Sagamore Beach: Watson Publishing International, 2006), 187-215.
LaFeber, Walter, "Presidential Address: Technology and U.S. Foreign Relations", *Diplomatic History* 24:1 (2000), 1-19.
Lakomaa, Erik, "The history of business and war: Introduction", *Scandinavian Economic History Review* 65:3 (2017), 224-230.
Lammers, Karl Christian and Poul Villaume, "Østersøkommandoen", in *Den Kolde Krig og Danmark. Gads Leksikon*, eds. John T. Lauridsen, et al. (København: Gads Forlag, 2011), 714-718.
Lane, Ann, "Introduction: The Cold War as History", in *The Cold War: The Essential Readings*, eds. Klaus Larres and Ann Lane (Oxford: Blackwell Publishers, 2001).
Larsen, Margit Bech, "Vejen til Danmarks sidste kystforter: Stevnsfort og Langelandsfort 1945-1954", *Fra Krig og Fred. Dansk Militærhistorisk Kommissions Tidsskrift* 2014:1 (2014).
Laursen, Johnny, *Politiets Efterretningstjeneste 1945-1968. PET's grundlæggelse og registreringer på det politiske område 1945-1968*, PET-kommissionens beretning (København: Justitsministeriet, 2009).
Leffler, Melvyn P., "The Emergence of an American Grand Strategy, 1945-1952", in *The Cambridge History of the Cold War* (Cambridge: Cambridge University Press, 2010), 67-89.

——, "National Security", *The Journal of American History* 77:1 (1990), 143-152.
——, *A Preponderance of Power: National Security, the Truman Administration, and the Cold War* (Stanford, Ca.: Stanford University Press, 1992).
Lewis, Ted G., "Telecommunication: Critical Infrastructure Protection", in *Communication and Information Systems Security*, ed. John G. Voeller (Somerset, US: John Wiles & Sons, Inc., 2014).
Lidegaard, Bo, "Et andet syn på dansk diplomati", *Historisk Tidsskrift* 97:2 (1997), 512-526.
——, *I Kongens Navn. Henrik Kauffmann i dansk diplomati 1919-1958* (København: Samleren, 1996).
Linnarsson, Magnus, "Rayon för rikets försörjning: Kris, korporatism och beredskapspolitik, 1972-1983", *Historisk Tidsskrift (Sweden)* 133:1 (2013), 34-64.
Loth, Wilfried, "The Korean War and the Reorganization of the European Security System, 1948-1955", in *The Quest for Stability: Problems of West European Security 1918-1957*, eds. Ahmann, et al. (Oxford: Oxford University Press, 1993).
Lous, Einer V., "Telegraf 1920-74", in *Bogen om post og tele*, eds. A. Morell Nielsen, et al. (København: Politikens Forlag, 1974), 323-348.
Lundestad, Geir, *Just Another Major Crisis: The United States and Europe since 2000* (Oxford: Oxford University Press, 2008).
——, *No End to Alliance: The United States and Western Europe: Past, Present and Future* (London: Macmillan, 1998).
Lundin, Per, "De Små Stegen. Nordiskt telesamarbete i ett historiskt perspektiv", *Polhem. Tidsskrift för Teknikhistoria* 17:2-4 (1999), 168-200.
Mackenzie, Donald, *Inventing Accuracy. A Historical Sociology of Nuclear Missile Guidance* (Cambridge, Massachusetts: The MIT Press, 1990).
Mariager, Rasmus, "Den Kolde Krig i international og dansk historieforskning", in *Den Kolde Krig og Danmark. Gads Leksikon*, eds. John T. Lauridsen, et al. (København: Gads Forlag, 2011), 720-746.
Marklund, Andreas, "Global Peace and Bolshevik Agitation. Hopes and Fears Around Transnational Communications in Interwar Scandinavia", (Unpublished, World Economic History Congress, Boston, July-August 2018)
——, "Listening for the state: censoring communications in Scandinavia during World War I", *History and Technology* 32:3 (2016), 293-314.
——, "A Stake in Public Confidence: Communications Privacy and the Interests of the State during the Establishment of Modern Telecommunications in Denmark", in *Historicizing Infrastructure*, eds. Andreas Marklund and Mogens Rüdiger (Aalborg: Aalborg University Press, 2017), 137-158.

——, "Suspekte beskeder. Overvågning af nationale og transnationale informationsstrømme i telegrafens tidsalder", *Temp - Tidsskrift for historie* 14 (2017), 57-75.
——, "Trawling the Wires. Mass Surveillance of Border-Crossing Communication in Denmark during World War Two", *Technology and Culture* (Forthcoming).
Marklund, Andreas and Mogens Rüdiger, "Historicizing Infrastructure: After the material turn", in *Historicizing Infrastructure*, eds. Andreas Marklund and Mogens Rüdiger (Aalborg: Aalborg University Press, 2017).
Mastny, Vojtech, Sven Holtsmark and Andreas Wenger, eds., *War Plans and Alliances in the Cold War: Threat Perceptions in the East and West*, CSS Studies in Security and International Relations (London: Routledge, 2006).
Mau, Mark, *Kampen om telefonen. Det danske telefonvæsen under den tyske besættelse 1940-45*. PhD Thesis (Center for Virksomhedshistorie, Copenhagen Business School, 2007).
May, Ernest R., *American Cold War Strategy. Interpreting NSC 68* (Boston and New York: Bedford Books of St. Martin's Press, 1993).
McEnaney, Laura, *Civil Defense Begins at Home: Militarization Meets Everyday Life in the Fifties* (Princeton: Princeton University Press, 2000).
McGinn, John G., "NATO in the Aftermath of the 1968 Invasion of Czechoslovakia", in *A History of NATO: The First Fifty years. Vol. II*, ed. Gustav Schmidt (Basingstoke: Palgrave, 2001), 197-208.
McGlade, Jacqueline, "NATO Procurement and the Revival of European Defense, 1950-60", in *A History of NATO: The First Fifty years. Vol. III*, ed. Gustav Schmidt (Basingstoke: Palgrave, 2001), 13-28.
McMahon, Robert J., "US national security policy from Eisenhower to Kennedy", in *The Cambridge History of the Cold War* (Cambridge: Cambridge University Press, 2010), 288-311.
Michalis, Maria, *Governing European Communications: From Unification to Coordination* (Plymouth, UK: Lexington Books, 2007).
Miller, David, *The Cold War – A Military History* (New York: St. Martin's Press, 1998).
Millward, Robert, "Business and the State", in *The Oxford Handbook of Business History*, eds. Geoffrey Jones and Jonathan Zeitlin (Oxford: Oxford University Press, 2008).
——, "European governments and the infrastructure industries, c. 1840-1914", *European Review of Economic History* 8 (2004), 3-28.
——, *Private and public enterprise in Europe: Energy, telecommunications and transport, 1830-1990*, Cambridge Studies in Economic History (Cambridge: Cambridge University Press, 2005).
Milward, Alan S., "Different Securities? NATO and the Transformation of the State", in *A History of NATO: The First Fifty years. Vol. I*, ed. Gustav Schmidt (Basingstoke: Palgrave, 2001), 15-26.

Misa, Thomas and Johan Schot, "Introduction: Inventing Europe: Technology and the Hidden Integration of Europe", *History and Technology* 21:1 (2005), 1-19.
Monsen, Peter, "Fading Channel Communications. Adaptive processing can reduce the effects of fading on beyond-the-horizon digital radio links", *IEEE Communications Magazine* 18:1 (1980), 16-25.
Mouritzen, Hans, "Alliancedilemma", in *Den Kolde Krig og Danmark. Gads Leksikon*, eds. John T. Lauridsen, et al. (København: Gads Forlag, 2011), 75-76.
Müller, Simone M., "From Cabling the Atlantic to Wiring the World. A Review Essay on the 150th Anniversary of the Atlantic Telegraph Cable of 1866", *Technology and Culture* 57:3 (2016), 507-526.
——, *Wiring the World: The Social and Cultural Creation of Global Telegraph Networks* (New York: Columbia University Press, 2016).
NATO, *50 Years of Infrastructure. NATO Security Investment Programme is the Sharing of Roles, Risks, Responsibilities, Costs and Benefits* (Brussels: NATO Infrastructure Committee, 2001).
——, "NATO Cyber Defence", https://www.nato.int/nato_static_fl2014/assets/pdf/pdf_2016_07/20160627_1607-factsheet-cyber-defence-eng.pdf (July 2016), accessed August 15 2018.
Nehring, Holger, "What Was the Cold War?", *The English Historical Review* 127:527 (2012), 920-949.
Nielsen, Gunnar, "Kabler og forstærkerstationer", in *Bogen om post og tele*, eds. A. Morell Nielsen, et al. (København: Politikens Forlag, 1974), 276-294.
Nielsen, Jacob Vrist, *Er der nogen på linjen? Telefonhemmeligheden i Danmark 1933-43*. Unpublished Master's Thesis (The Saxo Institute, University of Copenhagen, 2015).
Nilsson, Mikael, "Amber Nine: NATO's Secret Use of A Flight Path Over Sweden and the Incorporation of Sweden in NATO's Infrastructure", *Journal of Contemporary History* 44:2 (2009), 287-307.
——, *Tools of Hegemony: Military Technology and Swedish-American Security Relations, 1945-1962*. Doctoral Thesis (Philosophy and History of Technology, School of Architecture and the Built Environment (ABE), KTH - Royal Institute of Technology, 2007).
Oakes, Guy, *The Imaginary War: Civil Defense and American Cold War Culture* (Oxford: Oxford University Press, 1995).
Olesen, Niels Wium, *De Danske Ministerier 1972-1993. Del 2: Poul Schlüters Tid 1982-1993* (København: Gads Forlag, 2018).
Olesen, Thorsten Borring, "Den Kolde Krigs Historie", in *Den Kolde Krig og Danmark. Gads Leksikon*, eds. John T. Lauridsen, et al. (København: Gads Forlag, 2011), 11-27.
Olsen, Ole Jess, *Regulering af offentlige forsyningsvirksomheder i Danmark: Telekommunikation, kollektiv transport og ledningsbunden energi* (København: Jurist- og Økonomforbundet, 1993).

Oreskes, Naomi, "Introduction", in *Science and Technology in the Global Cold War*, eds. Naomi Oreskes and John Krige (Cambridge, Massachusetts: The MIT Press, 2014).
——, "Science in the Origins of the Cold War", in *Science and Technology in the Global Cold War*, eds. Naomi Oreskes and John Krige (Cambridge, Massachusetts: The MIT Press, 2014), 11-29.
Oreskes, Naomi and John Krige, *Science and technology in the global cold war* (Cambridge, Massachusetts: The MIT Press, 2014).
Park, William, *Defending the West. A History of NATO* (Brighton: Wheatsheaf, 1986).
Pedersen, Poul Holt, "Presseberedskabet under Den kolde krig. Planlægningen af nyheds- og informationstjenestens rolle i tiden op til, under og efter en national krise eller krig på dansk jord", http://www.reganvest.dk/presseberedskab-reganvest.pdf (2014), accessed March 23, 2018.
Pedersen, Poul Holt and Karsten Pedersen, *Danmarks Dybeste Hemmelighed. REGAN VEST - Regeringens og Kongehusets Atombunker*. Vol. 3. revideret udgave (Værløse: Billesø & Baltzer, 2014).
Pedersen, Thomas, "Sikkerhedsbegrebet", in *Fred og Konflikt*, eds. Henning Gottlieb, et al. (København: Det Sikkerheds- og Nedrustningspolitiske Udvalg, 1991).
Pedersen, Thomas Tram, "Beskyttelsen af civile", in *Kold Krig. 33 Fortællinger om Den Kolde Krigs Bygninger og Anlæg i Danmark, Færøerne og Grønland*, eds. Morten Stenak, et al. (København: Kulturstyrelsen, 2014), 26-31.
——, "Det totale forsvar til den totale krig", in *Kold Krig. 33 Fortællinger om Den Kolde Krigs Bygninger og Anlæg i Danmark, Færøerne og Grønland*, eds. Morten Stenak, et al. (København: Kulturstyrelsen, 2014), 18-25.
Petersen, Henrik G. and Niels Jacobsen, "Totalforsvaret og det civile beredskab", *Militært Tidsskrift* 1997:3 (1997), 215-239.
Petersen, Klaus, "Velfærdsstaten", in *Den Kolde Krig og Danmark. Gads Leksikon*, eds. John T. Lauridsen, et al. (København: Gads Forlag, 2011), 676-679.
Petersen, Klaus and Nils Arne Sørensen, "From Military State to Welfare State: The Warfare-Welfare Nexus in Denmark, 1848-1950s", in *Warfare & Welfare. Military Conflict and Welfare State Development in Western Countries*, eds. Herbert Obinger, et al. (Oxford: Oxford University Press, 2018), 290-319.
Petersen, Nikolaj, "Abandonment vs. Entrapment: Denmark and Military Integration in Europe 1948-1951", *Cooperation and Conflict* XXI (1986), 169-186.
——, "Afskrækkelsespolitik", in *Den Kolde Krig og Danmark. Gads Leksikon*, eds. John T. Lauridsen, et al. (København: Gads Forlag, 2011), 60-63.

——, "Bargaining Power among Potential Allies: Negotiating the North Atlantic Treaty, 1948-49", *Review of International Studies* 12:3 (1986), 187-203.
——, *Denmark and NATO 1949-1987*, Forsvarsstudier 2 (Oslo: Forsvarshistorisk forskningssenter, 1987).
——, "The Dilemmas of Alliance: Denmark's Fifty Years with NATO", in *A History of NATO: The First Fifty years. Vol. III*, ed. Gustav Schmidt (Basingstoke: Palgrave, 2001), 275-293.
——, *Europæisk og Globalt Engagement, 1973-2006*, Edited by Carsten Due-Nielsen, et al., 2. udgave ed, Dansk Udenrigspolitiks Historie (København: Dansk Nationalleksikon, 2006).
——, "Forsvarsministeriet", in *Den Kolde Krig og Danmark. Gads Leksikon*, eds. John T. Lauridsen, et al. (København: Gads Forlag, 2011), 274-276.
——, "Forsvarspolitik", in *Den Kolde Krig og Danmark. Gads Leksikon*, eds. John T. Lauridsen, et al. (København: Gads Forlag, 2011), 276-280.
——, "Krisestyring", in *Den Kolde Krig og Danmark. Gads Leksikon*, eds. John T. Lauridsen, et al. (København: Gads Forlag, 2011), 401-403.
——, "National strategies in the integration dilemma: An Adaptation Approach", *Journal of Common Market Studies* 36:1 (1998), 33-54.
Petersen, Søren, "Linien til Larsen på landet", *Aspekt* 4:7 (1998), 9.
Reynolds, David, "Science, technology, and the Cold War", in *The Cambridge History of the Cold War*, eds. Melvyn P. Leffler and Odd Arne Westad (Cambridge: Cambridge University Press, 2010), 378-399.
Riis-Knudsen, Asbjørn Rune, "Totalforsvar på skinner", *Jernbanehistorie* (2014), 26-43.
——, *Totalforsvar på skinner. DSB's rolle i totalforsvaret af Danmark under den kolde krig*. Unpublished Master's Thesis (University of Southern Denmark, Department of History, 2013).
Rinde, Harald, *Kontingens og Kontinuitet. Framveksten av stiavhengige organisasjonsmønstre i skandinavisk telefoni*. Doktordisputats (Det historisk-filosofiske fakultet, Oslo Universitet, 2004).
Ringsmose, Jens, "Paying for Protection: Denmarkøs Military Expenditure during the Cold War", *Cooperation and Conflict* 44:1 (2009), 73-97.
Risso, Linda, "NATO and the Environment: The Committee on the Challenges of Modern Society", *Contemporary European History* 25:3 (2016), 505-535.
——, *Propaganda and Intelligence in the Cold War: The NATO Information Service*, Studies in Intelligence (London: Routledge, 2014).
——, "Radio Wars: Broadcasting in the Cold War", *Cold War History* 13:2 (2013), 145-152.
Riste, Olav, "Cold War Intelligence in Scandinavia. Introduction", *The Journal of Strategic Studies* 29:4 (2006), 571-574.
Rohan, Sally, *The Western European Union: International Politics between Alliance and Integration* (New York: Routledge, 2014).

Romero, Federico, "Cold War historiography at the crossroads", *Cold War History* 14:4 (2014), 685-703.
Rose, Kenneth D., *One Nation Underground. The Fallout Shelter in American Culture* (New York: New York University Press, 2004).
Ryan, Johnny, *A History of the Internet and the Digital Future* (London: Reaktion Books, 2010).
Saunier, Pierre-Yves, "Going transnational? News from down under: Transnational History Symposium, Canberra, Australian National University, September 2004", *Historical Social Research / Historische Sozialforschung* 31:2 (2006), 118-131.
——, "Transnational", in *The Palgrave Dictionary of Transnational History: From the mid-19th century to the present day*, eds. Akira Iriye and Pierre-Yves Saunier (Basingstoke, Hampshire: Palgrave Macmillan, 2009), 1047-1055.
Schipper, Frank and Johan Schot, "Infrastructural Europeanism, or the project of building Europe on infrastructures: an introduction.", *History and Technology* 27:3 (2011), 245-264.
Schmidt, Gustav ed.*A History of NATO: The First Fifty years*. Vol. I-III (Basingstoke: Palgrave, 2001).
Schmidt, Regin, *PET's Overvågning af Arbejdsmarkedet 1945-1989. Fra samarbejde til overvågning. AIC, fagbevægelsen og faglige konflikter under den kolde krig*, PET-kommissionens beretning (København: Justitsministeriet, 2009).
Schmidt, Regin and Nikoline Nyholm Miller, *PET's virkemidler: Internationalt samarbejde, kildeføring, aflytning m.v.*, PET-kommissionens beretning (København: Justitsministeriet, 2009).
Schot, Johan and Vincent Lagendijk, "Technocratic Internationalism in the Interwar Years: Building Europe on Motorways and Electricity Networks", *Journal of Modern European History* 6:2 (2008), 196-217.
Slotten, Hugh Richard, "International Governance, Organizational Standards, and the First Global Satellite Communication System", *The Journal of Policy History* 27:3 (2015), 521-549.
——, "The International Telecommunications Union, Space Radio Communications, and U.S. Cold War Diplomacy, 1957-1963", *Diplomatic History* 37:2 (2013), 313-371.
——, "Satellite Communications, Globalization, and the Cold War", *Technology and Culture* 43:2 (2002), 315-350.
Sluga, Glenda, "Editorial - the transnational history of international institutions", *Journal of Global History* 6:2 (2011), 219–222.
Snyder, Glenn Herald, *Alliance politics*, Cornell studies in security affairs (Ithaca, New York: Cornell University Press, 1997).
Starosielski, Nicole, *The Undersea Network* (Durham and London: Duke University Press, 2015).
Statsministeriet, "Regeringer siden 1848", http://www.stm.dk/_a_1620.html, accessed June 3 2018.
Stenak, Morten, Thomas Tram Pedersen, Peer Henrik Hansen and Martin Jespersen, eds.,*Kold Krig. 33 Fortællinger om Den Kolde Krigs*

Bygninger og Anlæg i Danmark, Færøerne og Grønland (København: Kulturstyrelsen, Kulturministeriet, 2014).
Stevnsborg, Henrik, *Magt, krig og centralisering. Dansk politi 1945-2007* (København: Jurist- og Økonomforbundets Forlag, 2016).
Sylvest, Casper, "Atomfrygten og Civilforsvaret", *Temp - Tidsskrift for historie* 16 (2018), 16-39.
Szawlowski, Richard, *The System of the International Organizations of the Communist Countries* (Leyden: A.W. Sijthoff, 1976).
Sørensen, Nils Arne, "Amerikanisering", in *Den Kolde Krig og Danmark. Gads Leksikon*, eds. John T. Lauridsen, et al. (København: Gads Forlag, 2011), 78-81.
——, "Den transnationale vending?", *Historisk Tidsskrift* 109:2 (2009), 459-472.
Thies, Wallace J., *Friendly Rivals: Bargaining and Burden-shifting in NATO* (London and New York: Routledge, 2015).
Thue, Lars, *Nye forbindelser 1970-2005*. Vol. Bind III, Norsk Telekommunikasjonshistorie (Oslo: Gyldendal Norsk Forlag, 2005).
Trachtenberg, Marc, *A Constructed Peace. The Making of the European Settlement, 1945-1963*, Princeton Studies in International History and Politics (Princeton, NJ: Princeton University Press, 1999).
——, "The Nuclearization of NATO and U.S.-West European Relations", in *NATO: The Founding of the Atlantic Alliance and the Integration of Europe*, eds. Francis H. Heller and John R. Gillingham (New York: St. Martin's Press, 1992), 413-435.
Trischler, Helmuth and Hans Weinberger, "Engineering Europe: Big technologies and military systems in the making of 20th century Europe", *History and Technology* 21:1 (2005), 49-84.
Turchetti, Simone, *Greening the Alliance. The Diplomacy of NATO's Science and Environmental Initiatives* (Chigaco: University of Chigaco Press, 2018 [Forthcoming]).
——, "Sword, Shield and Buoys: A History of the NATO Sub-Committee on Oceanographic Research, 1959-1973", *Centaurus* 54:3 (2012), 205–231.
Turchetti, Simone and Peder Roberts, eds., *The Surveillance Imperative: Geosciences during the Cold War and beyond*, Palgrave studies in the history of science and technology (New York: Palgrave Macmillan, 2014).
Tworek, Heidi J. S., "How not to build a world wireless network: German–British rivalry and visions of global communications in the early twentieth century", *History and Technology* 32:2 (2016), 178-200.
——, *News from Germany: The Competition to Control World Communications, 1900-1945* (Cambridge, Massachusetts: Harvard University Press, Forthcoming).
Tworek, Heidi J. S. and Simone M. Müller, "Introduction", *The Journal of Policy History* 27:3 (2015), 405-415.
van der Vleuten, Erik, "Toward a Transnational History of Technology: Meanings, Promises, Pitfalls", *Technology and Culture* 49:4 (2008), 974-994.

——, "Understanding Network Societies: Two Decades of Large Technical System Studies", in *Networking Europe. Transnational Infrastructures and the Shaping of Europe, 1850-2000*, eds. Erik van der Vleuten and Arne Kaijser (Sagamore Beach: Watson Publishing International, 2006), 279-314.

van der Vleuten, Erik, Irene Anastasiadou, Vincent Lagendijk and Frank Schipper, "Europe's System Builders: The Contested Shaping of Transnational Road, Electricity and Rail Networks", *Contemporary European History* 16:3 (2007), 321-347.

van der Vleuten, Erik, Per Högselius, Anique Hommels and Arne Kaijser, "Europe's Critical Infrastructure and Its Vulnerabilities - Promises, Problems, Paradoxes", in *The Making of Europe's Critical Infrastructure. Common Connections and Shared Vulnerabilities*, eds. Per Högselius, et al. (Basingstoke: Palgrave Macmillan, 2013).

van der Vleuten, Erik and Arne Kaijser, "Networking Europe", *History and Technology* 21:1 (2005), 21-48.

——, "Prologue and Introduction: Transnational Networks and the Shaping of Contemporary Europe", in *Networking Europe. Transnational Infrastructures and the Shaping of Europe, 1850-2000*, eds. Erik van der Vleuten and Arne Kaijser (Sagamore Beach: Watson Publishing International, 2006), 1-22.

——, eds.,*Networking Europe. Transnational Infrastructures and the Shaping of Europe, 1850-2000* (Sagamore Beach: Watson Publishing International, 2006).

van Heuven, Marten H. A., "Civil Emergency Planning in NATO", *The International Lawyer* 4:3 (1970), 391-398.

van Laak, Dirk, "Der Begriff "Infrastruktur" und was er vor seiner Erfindung besagte", *Archiv für Begriffsgeschichte* 41 (1999), 280-299.

——, "Technological Infrastructure, Concepts and Consequences", *ICON. Journal of the International Committee for the History of Technology* 10 (2004), 53-64.

van Tets, G.O.J., "The Birth and Significance of Common Infrastructure", *The Fifteen Nations* 2 (1956), 50-54.

Villaume, Poul, *Allieret med Forbehold. Danmark, NATO og den kolde krig* (København: Eirene, 1995).

——, "Atomvåbenpolitik", in *Den Kolde Krig og Danmark. Gads Leksikon*, eds. John T. Lauridsen, et al. (København: Gads Forlag, 2011), 104-111.

——, "Den Kolde Krigs Historie", in *Den Kolde Krig og Danmark. Gads Leksikon*, eds. John T. Lauridsen, et al. (København: Gads Forlag, 2011), 27-40.

——, "Harmel-rapporten", in *Den Kolde Krig og Danmark. Gads Leksikon*, eds. John T. Lauridsen, et al. (København: Gads Forlag, 2011), 332-334.

——, "Nato og Danmark 1949-72", in *Den Kolde Krig og Danmark. Gads Leksikon*, eds. John T. Lauridsen, et al. (København: Gads Forlag, 2011), 439-446.

Villaume, Poul, Rasmus Mariager and Helle Porsdam, "Introduction: The 'Long 1970s': New Perspectives on an Epoch-Making Decade", in *The 'Long 1970s': Human Rights, East-West Détente and Transnational Relations*, eds. Poul Villaume, et al. (London and New York: Routledge, 2016).

Villaume, Poul and Thorsten Borring Olesen, *I Blokopdelingens Tegn, 1946-1972*, Edited by Carsten Due-Nielsen, et al., 2. udgave ed, Dansk Udenrigspolitiks Historie (København: Dansk Nationalleksikon, 2006).

Villaume, Poul and Odd Arne Westad, eds.,*Perforating the Iron Curtain. European Détente, Transatlantic Relations, and the Cold War, 1965-1985* (Copenhagen: Museum Tusculanum Press, 2010).

Ward, Jacob, *Information and Control: Inventing the Communications Revolution in Post-War Britain*. PhD Thesis (History of Science and Technology, UCL, 2017).

Weinberger, Hans, "The Neutrality Flagpole: Swedish Neutrality Policy and Technological Alliances, 1945-1970", in *Technologies of Power. Essays in Honor of Thomas Parke Hughes and Agatha Chipley Hughes*, eds. Michael Thad Allen and Gabrielle Hecht (Cambridge, Massachusetts and London: The MIT Press, 2001), 295-331.

Wenger, Andreas, "NATO's transformation in the 1960s and the ensuing political order in Europe", in *Transforming NATO in the Cold War: Challenges beyond Deterrence in the 1960s*, eds. Andreas Wenger, et al. (New York and Abingdon, UK: Routledge, 2007), 221-242.

Wenger, Andreas, Christian Nuenlist and Anna Locher, "New perspectives on NATO history", in *Transforming NATO in the Cold War: Challenges beyond Deterrence in the 1960s*, eds. Andreas Wenger, et al. (New York and Abingdon, UK: Routledge, 2007), 3-12.

——, eds.,*Transforming NATO in the Cold War: Challenges beyond Deterrence in the 1960s*, CSS Studies in Security and International Relations (New York and Abingdon, UK: Routledge, 2007).

Wentz, Larry K. and Gope D. Hingorani, "NATO Communications in Transition", *IEEE Transactions on Communications* 28:9 (1980), 1524-1539.

Westad, Odd Arne, "The Cold War and the International History of the Twentieth Century", in *The Cambridge History of the Cold War*, eds. Melvyn P. Leffler and Odd Arne Westad (Cambridge: Cambridge University Press, 2010), 1-19.

——, *The Cold War: A World History* (New York: Basic Books, 2017).

——, "Introduction: Reviewing the Cold War", in *Reviewing the Cold War*, ed. Odd Arne Westad (London and Portland, Oregon: Frank Cass, 2000).

Winkler, Jonathan Reed, "Bridging the Gap: The Cable and its Challengers, 1918-1988", in *Communications Under the Seas: The Evolving Cable Network and Its Implications*, eds. Bernard Finn and Daqing Yang (Cambridge, Massachusetts: The MIT Press, 2009).

Winseck, Dwayne R. and Robert M. Pike, *Communication and Empire. Media, Markets, and Globalization, 1860-1930* (Durham and London: Duke University Press, 2007).
Ziauddin, Silvia Berger, "Superpower Underground: Switzerland's Rise to Global Bunker Expertise in the Atomic Age", *Technology and Culture* 58:4 (2017), 921-954.

Annex A:

List of committees, authorities etc.

English name	Danish name	Description
Allied Long Lines Agency (ALLA)		In 1965, ELLA was renamed ALLA. The terms of reference for ALLA were to support NATO's Standing Group, commands, national forces, and civil emergency agencies in having their requirements for long lines met in the most efficient manner.
The Chief of Defence	Forsvarschefen (FCH)	The supreme commander of the Danish Defence. The position was established 1950 to ensure a joint command of all the defence services.
Civil Communications Planning Committee (CCPC)		Established in 1957 in order to study the overall requirements for communications needed for civil purposes in time of war and make recommendations for how to close gaps in communications requirements in wartime.
Civil Defence	Civilforsvaret	A general term for all parts of the Civil Defence in Denmark, including the Civil Defence Board and the planning of civil defence activities at the local level. The Civil Defence was established with a law of April 1 1949 as a successor to the State Civil Air Defence [Statens Civile Luftværn], which had existed since 1938 and was responsible for planning for the protection of the civilian population in case of air strikes. The Civil Defence engaged both conscripted and volunteer personnel that could be drafted in case of mobilization.
Civil Defence Board	Civilforsvarsstyrelsen (CFS)	The board in charge of the central planning of the Civil Defence. Established with the law on Civil Defence of April 1949 and placed under the Ministry of Interior.
Committee for Defence Economy	Det Forsvars-økonomiske Udvalg	A committee of civil servants established by the Danish government in October 1950 with the task of coordinating financial questions related to the military and civilian defensive measures taken in this period.
Committee for Defence Rationalisation	Forsvarets Rationaliseringsudvalg	Established by the Ministry of Defence in 1953 in order to evaluate the administration of the defence staff. In June 1957, the committee was asked to review the Defence Telegraph Administration.
Coordination Committee under the Telephone Control Board	Samarbejdsudvalget (SU) Samordningsudvalget (SO)	A coordination committee established under the Telephone Control Board in 1948 in order to ensure the necessary internal cooperation between the telephone

		administrations, in particular in technical and standardisation matters.
Defence Command Denmark	Forsvarskommandoen (FKO)	As part of a 1969 reorganisation of the Danish Defence, the Defence Command was established in 1970. Thereby, the different commands within the defence (the Army Command, the Naval Command, and the Air Command) were organised in a joint command.
Defence Telegraph Administration	Forsvarets Telegrafforvaltning (FTF)	A special defence committee existing from 1952 to 1962. The Defence Telegraph Administration coordinated the technical and financial planning and administration of the permanent telecommunication services of the defence.
European Long Lines Agency (ELLA)		Established under SHAPE in 1951 in order to coordinate matters concerning the use of national telecommunications facilities in support of the military effort for the defence of Western Europe. Renamed ALLA in 1965. Responsible to the Military Committee and Located in Brussels.
European Military Communications Coordination Committee (EMCCC)		Established under SHAPE in 1951 in order to study the work needed to be done to implement the agreed signal communications plans.
European Frequency Agency (ERFA)		Established under SHAPE in 1951 in order to coordinate matters concerning the use of radio frequencies in support of the military effort for the defence of Western Europe.
	Fyns kommunale Telefonselskab (FkT)	The telephone company on Funen, which existence reaches back to the establishment of Odense Telefon-Selskab in 1884. The company later came to cover the entire Funen area and was organised as a cooperative society in which the local municipalities were partners.
Government Committee for Civil Emergency Planning	Regeringsudvalget for Civilt Beredskab (RUCB)	A government committee established in 1956 to further and coordinate the planning of civil preparedness issues on the highest political level.
Inter-Ministerial Signal Committee	Den Interministerielle Signalkomité (IMSK)	Established in 1953 as a consultative committee coordinating civilian and military interests in telecommunications. Members were appointed by the Ministry of Defence and the Ministry of Public Works, and the General Director of the P&T served as chairman. IMSK was closed down in 1993.
	Jydsk Telefon A/S (JTAS)	The telephone company serving most parts of Jutland. The company was established in 1895, when 17 local telephone companies merged into one. From 1942, the Danish state owned the majority of the company. In 1992, the company was incorporated into Tele

		Danmark along with the other regional telephone companies.
	Kjøbenhavns Telefon A/S (KTAS)	The telephone company serving Copenhagen, Zealand, Bornholm and Lolland-Falster in the period under study. The company reaches back to 1881. From 1939, the Danish state owned the majority of the company. In 1992, the company was incorporated into Tele Danmark along with the other regional telephone companies.
National Board on Telecommunications	Statens Teleråd	The National Board on Telecommunications was from 1982 the successor to the Telephone Control Board.
National Telecom Service	Statens Teletjeneste	A state-owned company established in 1986. The company took over the international telecommunication services and a few nationwide tasks from the P&T. As of 1991, the assets and liabilities of National Telecom Service were transferred to Tele Denmark.
National Long Lines Agency Denmark (NALLA Denmark)		A coordinating agency established under the Ministry of Defence in 1961. Prior to this, the agency had existed temporarily during signal exercises. In 1975, the responsibility of NALLA was transferred to the Postal and Telegraph Services (P&T). From 1991, NALLA was placed under the National Telecom Agency [Telestyrelsen], later the National IT and Telecom Agency [IT- og Telestyrelsen]. NALLA was closed down in 2008, whereupon its field of responsibility and archives were transferred to the Danish Defence Intelligence Services [Forsvarets Efterretningstjeneste].
Postal and Telegraph Services	Post- og Telegrafvæsenet (P&T)	A state directorate in charge of postal and telecommunications matters established in 1927 by merging the activities of the Post Services and Telegraph Services. The P&T was headed by a General Directorate and was placed as a department under the Ministry of Public Works.
Secretariat for Civil Emergency Planning	Sekretariatet for Civilt Beredskab (SCB)	The secretariat attached to the Government Committee for Civil Emergency Planning established in 1956. In 1962, the secretariat was transferred from the Prime Minister's Office to the Ministry of Interior.
Senior Civil Emergency Planning Committee (SCEPC)		Established by the NATO Council with a resolution of November 1955. SCEPC was to advice the Council and make recommendations on all matters related to civil emergency planning and coordinate the activities of all emergency planning boards, committees, and working groups.
Supreme Allied Commander Europe (SACEUR)		The position as SACEUR was established by the NATO allies in 1950. SACEUR had operational control over all the forces assigned

		to the Allied Command Europe and was responsible for the organisation and training herof. In time of war, SACEUR would be responsible for the overall conduct of all operations under the Allied Command Europe.
Supreme Headquarters Allied Powers Europe (SHAPE)		The Headquarters of NATO's Allied Command Europe from 1951 to 2003. First located at Rocquencourt, France, from 1967 at Casteau, Mons, Belgium. Commanded by SACEUR.
Telephone Control Board	Telefontilsynet (TTS)	A supervisory organ established under the Ministry of Public Works in 1919. The control board supervised the telephone companies operating under concession and coordinated the cooperation between the ministry, the companies and the P&T.
Western Union Defence Organisation (WUDO)		The military body of the Western Union created with the 1948 Brussels Treaty between the UK, France, and the Benelux countries. WUDO was active as of September 1948 with headquarters in Fontainebleau, France. WUDO was disbanded in December 1951 and its headquarters, personnel and plans transferred to NATO.